AN HBJ PUBLICATION

June 1983/$2.00

WEEDS TREES & TURF

The Magazine of Landscape and Golf Course Design, Construction and Care Since 1962

Coring Over Verticutting, Researcher Tells Why

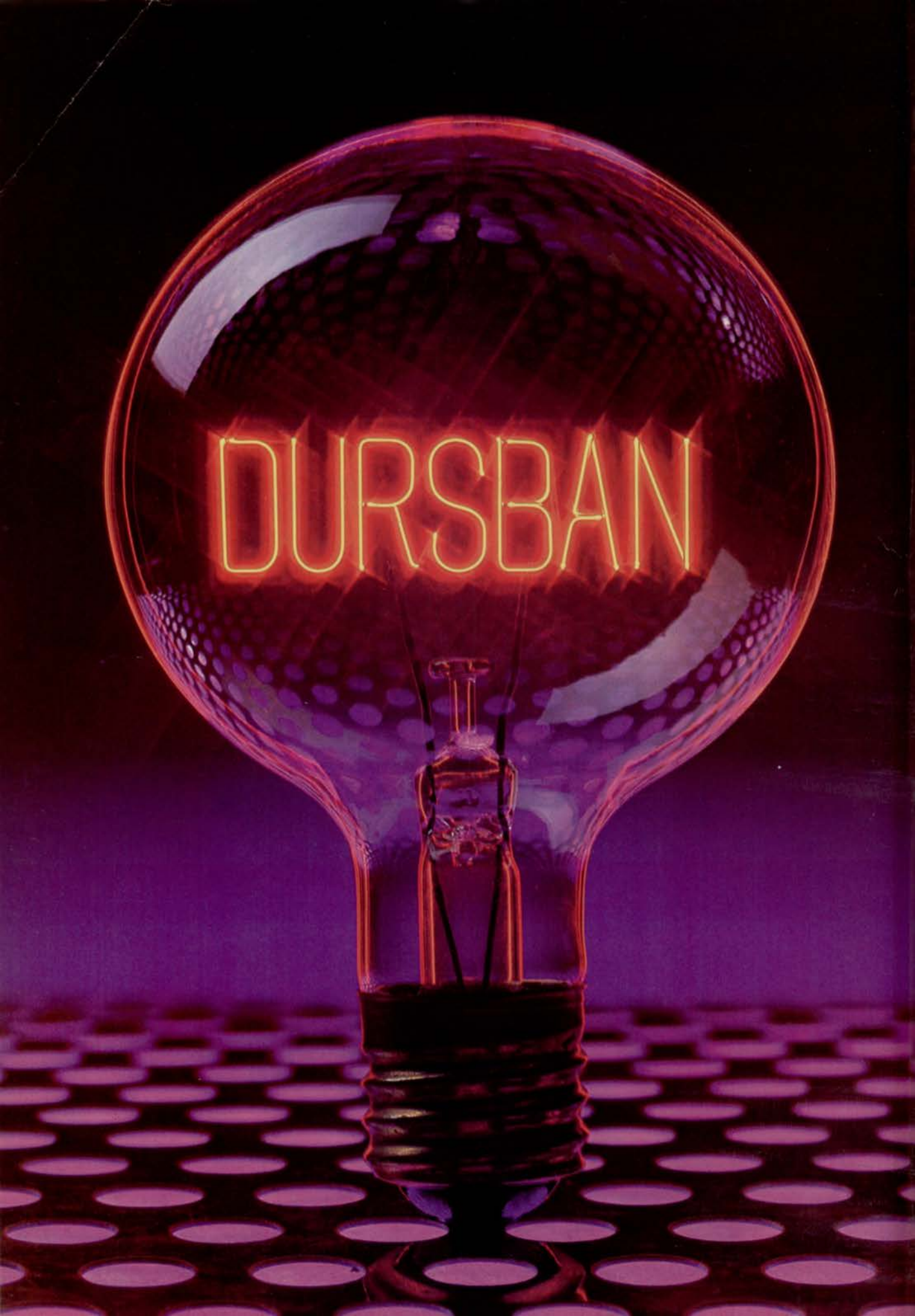
Growth Regulator Use Heats Up as Objectives Change

Baseball Field Renovation

Profiles in Park Management

SPORTS TURF ISSUE

Salem, Oregon park crew aerifies turf.


DURSBAN

The energy behind the idea never runs out.

Good ideas come and go. Even some of the best ideas eventually fade away. Why? Because it takes a constant flow of energy to keep an idea fresh and bright.

DURSBAN* insecticides are a perfect example. 17 years ago they were a good idea. But with the full energy of Dow behind them, they are among the most widely used insecticides on the market.

It all started when Dow developed chlorpyrifos—the active ingredient in DURSBAN insecticides, and still the most effective ingredient available. Since that time, Dow has invested a lot of energy in continual research and development programs to expand the uses and registrations of DURSBAN.

And each new registration means more business for you. More species of insects you can control. More outdoor customers you can serve.

Without Dow behind the idea, you wouldn't have all the different DURSBAN insecticides. You wouldn't have DURSBAN 2E and double-strength 4E or 50WP to control just about any outdoor insect.

But there's more. When you use a DURSBAN insecticide you're plugged into all the product support and marketing expertise Dow has to offer. Dow not only backs DURSBAN products and their performance, it stands behind the industry. Dow contributes financial, educational and research support to the Professional Lawn Care Association and Golf Course Superintendents Association. Dow offers you and your distributor sales literature and training programs to help you manage your business better, valuable incentive programs and a whole lot more.

Remember, anybody can come up with a good idea, but it takes a company like Dow to make it work for you. Agricultural Products Department, Midland, MI 48640.

DURSBAN

The best idea in bug control.

DOW

Dow Chemical U.S.A.

*Trademark of The Dow Chemical Company

3913

Circle No. 108 on Reader Inquiry Card

WT&T

The central feature of the Salem, Oregon, park system is a small river. The turf area around the river is periodically aerified to prevent compaction problems from foot traffic. Photo by Larry Kassell.

JUNE 1983/VOL. 22, NO. 6

Baseball field renovation, see page 28

22
Thatch Control by Core Cultivation

Complete removal of thatch may not be the most desirable way to solve thatch problems. Karl Danneberger of Michigan State University suggests coring and cultivating the cores with the thatch creates a hybrid thatch with improved characteristics. Disruption of the turf by thatch removal is lessened.

28
Giving New Life to Old Baseball Fields

Managers of baseball fields in the transition zone should get special benefit from this article by Professor Portz, of Southern Illinois University-Carbondale. Correcting drainage and compaction problems are preferred over building new fields. Portz gives tips to construction and maintenance of baseball fields.

38
Parks Stretch to Meet Field Demand

A survey of park superintendents reveals park budgets and staff have not matched the demand for playing fields. The superintendents report 40 percent allow sports leagues to perform some maintenance tasks. Field maintenance programs remain at utility only levels. Resources seem to be falling behind field needs.

40
The Orange Bowl After the Storm

Millions of television viewers saw the New York Jets-Miami Dolphins playoff game on the rain-soaked Orange Bowl field. Field manager Dale Sandin discusses that day and the field's qualities.

46
New Vitality In Growth Regulators

Changing uses and objectives for growth regulators have added new life and a line of new products. Mowing reduction, seedhead suppression, and new products are covered by Purdue University expert on growth regulators, Dr. Ray Freeborg.

52
PGRs and Poa: Golf Course Trials

Many of the early kinks with growth regulators have been solved with rate and timing studies. Now golf course superintendents can use PGRs to reduce Poa annua seedheads and improve heat tolerance. Superintendents and researchers cite examples.

The Orange Bowl, see page 40.

DEPARTMENTS

Outlook — 6
Green Industry News — 8
Golf Update — 10
Landscape Update — 14
Government Update — 16
Landscape Log — 20
Problem Solver — 64
Products — 68
Classifieds — 70
Advertiser Information — 72

Robert L. Edgell, Chairman; Richard Moeller, President; Lars Fladmark, Executive Vice President; Arland Hirman, Treasurer; Thomas Greney, Senior Vice President; Ezra Pincus, Senior Vice President; Pat O'Rourke, Group Vice President; Joe Bilderbach, Vice President; James Gherna, Vice President; George Glenn, Vice President; Harry Ramaley, Vice President.

WEEDS TREES & TURF (ISSN 0043-1753) is published monthly by Harcourt Brace Jovanovich Publications. Corporate and Editorial offices: 7500 Old Oak Boulevard, Cleveland, Ohio 44130. Advertising Offices: 757 Third Avenue, New York, New York 10017; 111 East Wacker Drive, Chicago, Illinois 60601 and 3091 Maple Drive, Atlanta, Georgia 30305. Accounting, Advertising Production and Circulation offices: 1 East First Street, Duluth, Minnesota 55802. Subscription rates: $16 per year in the United States; $20 per year in Canada. All other countries: $45 per year. Single copies (pre-paid only): $2 in the U.S.; elsewhere $4.50; add $3.00 for shipping and handling per order. Second class postage paid at Duluth, Minnesota 55806 and additional mailing offices. Copyright © 1983 by Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher. Microfilm copies of articles are available through University Microfilm, International, 300 N. Zeeb Road, Ann Arbor, Michigan 48106.

POSTMASTER: Send address changes to WEEDS TREES & TURF, P.O. Box 6198, Duluth, Minnesota 55806-9898. HBJ A HARCOURT BRACE JOVANOVICH PUBLICATION

Overseeding Oakmont Country Club

Persistence and Penneagle equal Perfection

The 1983 U.S. Open is at Oakmont, June 13-19

e entire course was extensively renovated. Playing was possible even though ring, topdressing and seeding were in progress.

"We kept our entire course in play while renovating. Now, the members know the results are worth it."

Paul Latshaw

Paul Latshaw
Supt. Oakmont Country Club

Tees were verticut to soil depth and overseeded with Penneagle.

"We've been overseeding every fall since 1977. We feel that our entire course is now seventy percent Penneagle."

Fairways being aerated in preparation for seeding with Penneagle. Punch aerification provides the best combination of compaction and thatch control, soil contact seedbed, and playable fairways for the membership.

The punched plugs were ground up prior to the overseeding process.

Penneagle was also broadcast over entire fairway in addition to groove-seeding.

"Since we renovate in the fall anyway, it was easy to overseed with Penneagle creeping bentgrass."

View from the clubhouse shows the combination ninth and practice green after extensive renovation. The fairway had just been aerated.

Penneagle mowed at 5/64 inch keeps greens consistently fast. Penneagle is the creeping bentgrass that performs.

PENNEAGLE

All-Purpose Creeping Bentgrass

TEE-2-GREEN CORP.

P.O. Box 250
Hubbard, OR 97032
1-800-547-0255
TWX 510-590-0957

PVP No. 7900009

In the twenty-five pound bag or the re-usable Penn Pail.

Circle No. 133 on Reader Inquiry Card

WTT OUTLOOK

By Bruce F. Shank, Executive Editor

New meaning to silent H

Much of the material in *Weeds Trees & Turf* is staff written. Much of it is written by William and Mary graduate Maureen Hrehocik who joined the magazine when it moved back to Cleveland in November. She has to spell her name every time she speaks to someone on the phone. A typical converstion may go like this . . .

"Hello, Mr. Anderson, this is Maureen Hrehocik from Weeds Trees & Turf magazine. I'd like to ask you a few questions about your weed control program . . . That's Maureen H-R-E-H-O-C-I-K, from W E E D S T R E E S A N D T U R F. Just pronounce it as if there were no H in front. Oh, no, not Weeds Turf and Trees, Weeds Trees and Turf. Now, can we talk about your weed control program?"

Maureen has struggled through all the preliminaries to write some excellent articles in the past eight issues. So, when she calls you, remember the H is silent and she works for Weeds Trees & Turf. She'll thank you for it.

While we're at it, my name is spelled S-H-A-N-K. Just like it sounds.

Filling the mid-management void

Traveling can be one of the best educations in the world. Being new to the Green Industry, I welcome the opportunity of gaining information any way I can.

Recently, I spent a few fruitful hours with seven members of the Professional Grounds Management Society in Baltimore. (It's surprising what can transpire over a platterful of steamed crabs . . .) We talked about a variety of subjects, but one theme that just seemed to keep resurfacing was the apparent surplus of labor and upper management positions in landscape management. The void seems to be at the supervisory and mid-management level. Ken Deis of Lasting Impressions Landscape Contractors in Glendale, MD, particularly felt the effect of this problem.

During another interview in November, Carl McCord of Landscape Design and Construction in Dallas, voiced the same concern. Industry employers also seem to be in agreement on another point. They are improving the caliber of worker instead of merely swelling the ranks of those they have working for them.

In this economy, when the buck must stretch to the limit, managers are finding bigger is not always better. In the long run, the better-qualified person, who will obviously command a higher salary at the outset, pays off in the long run. **Maureen Hrehocik**

WT&T Editorial Board

Euel Coats
Associate Professor
Weed Science
Mississippi State University

Douglas Chapman
Horticulturist
Dow Gardens
Midland, Michigan

Kent Kurtz
Professor
Horticulture
Cal Poly - Pomona

Harry Niemczyk
Professor,
Turfgrass Entomology
Ohio State University
Wooster, Ohio

Roger Funk
Vice President
Davey Tree Export Co.
Kent, Ohio

WT&T

Executive Editor
Bruce F. Shank, Cleveland

Associate Editor
Maureen Hrehocik, Cleveland

Publisher
Dick Gore, Atlanta

Senior Vice President
Tom Greney, Chicago

Group Publisher
Robert Earley, Cleveland

Production Manager
Kathy Judd, Duluth

Production Supervisor
Marilyn MacDonald, Duluth

Graphic Design
Diane Thomas, Duluth

Circulation Manager
Kristine Benike, Duluth

Directory Coordinator
Sheryl Albertson, Duluth

Reader Service Manager
Gail Kessler, Duluth

Promotion Manager
Linda Winick, Cleveland

OFFICES

ATLANTA
3091 Maple Drive
Maple Center One Building
Atlanta, GA 30305
(404) 233-1817

CLEVELAND
7500 Old Oak Boulevard
Cleveland, OH 44130
Editorial: (216) 243-8100

CHICAGO
111 East Wacker Drive
Chicago, IL 60601
(312) 938-2344

SEATTLE
1333 N.W. Norcross
Seattle, WA 98177
(206) 363-2864

DULUTH
120 West Second Street
Duluth, MN 55802
(218) 727-8511

MARKETING REPRESENTATIVES

Dick Gore
Atlanta (404) 233-1817

Ron Kempner
Atlanta (404) 233-1817

Joe Kosempa
Cleveland (216) 243-8100

Robert Mierow
Seattle: (206) 363-2864

Member; American Business Press, Business Publications Audit, National Golf Foundation, America Sod Producers Association, Associated Landscape Contractors of America, National Landscape Association, Horticultural Research Institute.

NORTHRUP KING PRESENTS

THE HEAVY TRAFFIC, CLEAN MOWING, SALT TOLERANT, DISEASE FIGHTING, SUN-TO-SHADE GRASS SEED.

No one grass seed combines every characteristic for every type of turf. That's why Northrup King research has developed a complete line of Medalist Turf Products to meet specialized professional needs.

MEDALIST TURF PRODUCT	MAJOR AREAS OF USE	SPECIAL FEATURES
Athletic Pro Mix	High maintenance athletic turf	Both are well suited for new seeding or overseeding. Fast establishing, excellent traffic tolerance, and rapid recovery. Provides good footing.
Athletic Pro II Mix	Low to moderate maintenance athletic turf.	
Boulevard Mix	Any area with high pH (roadsides, sidewalks, boulevards, beachfronts, etc.)	Contains both "Fults" *Puccinellia distans* and Dawson red fescue which thrive on high saline or alkaline soils. Performs at low to high fertility levels.
Landscape Pro Mix	School grounds, cemeteries, golf course roughs, lawns	Fast establishing. Adapts to broad range of conditions and management levels. Low to moderate fertility requirements.
Overseeder II Mix	Fairways, tees, athletic fields	Fast establishing, traffic tolerant, disease resistant, penetrates compacted soil.
Medalist North Mix	Fairways, tees, cart paths, wear areas	Long term quality in high traffic areas. Clean mowing and disease tolerant.
Premium Sod Blend	Commercial sod producers	Fast establishing, exceptional dark green color, shade tolerant, superior disease resistance.
Special Park Mix	Parks, commercial developments, lawns	Low fertility tolerance, shade tolerant, adapts to wide range of soil types.

Ask your Northrup King distributor about the Medalist Turf Products for your needs. Or write Northrup King Medalist Turf Products, P.O. Box 959, Minneapolis, MN 55440.

MEDALIST TURF PRODUCTS

Circle No. 122 on Reader Inquiry Card

Rumored cutbacks raise ire of AAN

According to the American Association of Nurserymen, strong indications are coming from Washington, D.C. alluding to plans to close the Agricultural Research Service's Nursery Crops Research Laboratory in Delaware, OH, and significantly reduce the scope of nursery-related research at the ARS laboratories in Mandan, ND, Corvallis, OR, and Tifton, GA.

The rumored reductions have brought an avalanche of protest and supporting arguments from the AAN office, including a 12-item list outlining the ARS' beneficial accomplishments to the nursery industry.

At press time, Duane F. Jelinek, director of horticultural services for the AAN, said the USDA's Six Year Implementation Plan 1984-1990, earmarked $29 million in cuts in broad agricultural categories, underscoring the belief by the AAN that the cuts are more than rumored.

"The ARS in Wooster, OH, which is an entomology lab studying Japanese beetle control, was told to prepare for reassignment," Jelinek said. "For the time being, this is on hold, however."

Jelinek also said an $18.1 million cut is earmarked for horticultural crops, including research on nursery farming programs.

"They (USDA) are being very closed-mouth about the whole thing," he said.

A call from WT&T to the Washington office of the Agricultural Subcommittee, brought no response.

Jelinek credits the AAN's quick response to the alleged rumor as thwarting some of its impact for the time being.

In March, the AAN gave testimony before the House Appropriations Committee expressing its concern about the detrimental effects the cuts would have.

"Of all the segments of agriculture," the AAN concluded, "the nursery industry is one of the few which has neither sought nor benefitted from government subsidies. No federal funds have been expended for crop supports, marketing orders, etc. As such, the federal government's contribution of minimal research is a reasonable expenditure of federal government funds.

"The mission of the Agricultural Research Service is to 'plan, develop and implement research that is designed to produce the new knowledge and technologies required to assure the continuing vitality of the nation's food and agriculture enterprise.' The nursery industry is an agricultural enterprise."

The laboratories in question, the AAN said, provide essential applied research for the industry. Closing of the Delaware laboratory and reducing research at the other facilities would eliminate nearly all horticultural research by the Agricultural Research Service. Since virtually all nursery firms lack the size and resources to conduct research themselves, the AAN concludes the closings would be extremely detrimental to the industry.

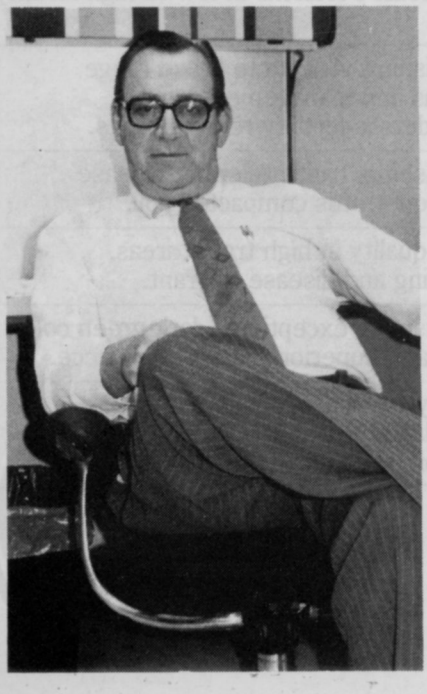
Jelinek said his office will continue to try to bring the alleged cutbacks out in the open and lobby for curtailment of reduced funding.

—Maureen Hrehocik

CHEMICALS

Mobay's Benson retires after 20 years

After 20 years with the Mobay Chemical Corporation, Oscar Benson, advertising manager for the Agricultural Chemicals Division, has retired to "fiddle with his gardening and cattle" on his small, Liberty, MO, farm.



Benson, 56, was responsible for ad accounts in excess of $10 million for Mobay.

"I will miss the involvement with company and industry people that I had for the past 20 years, he told WT&T.

Benson had served the company as technical editor and assistant ad manager before being promoted to advertising manager. He was also a county extension agent at the University of Missouri before joining Mobay.

His replacement is Ron Miller, 46, formerly sales manager and assistant advertising manager, who says the department will continue to be run as it has in the past.

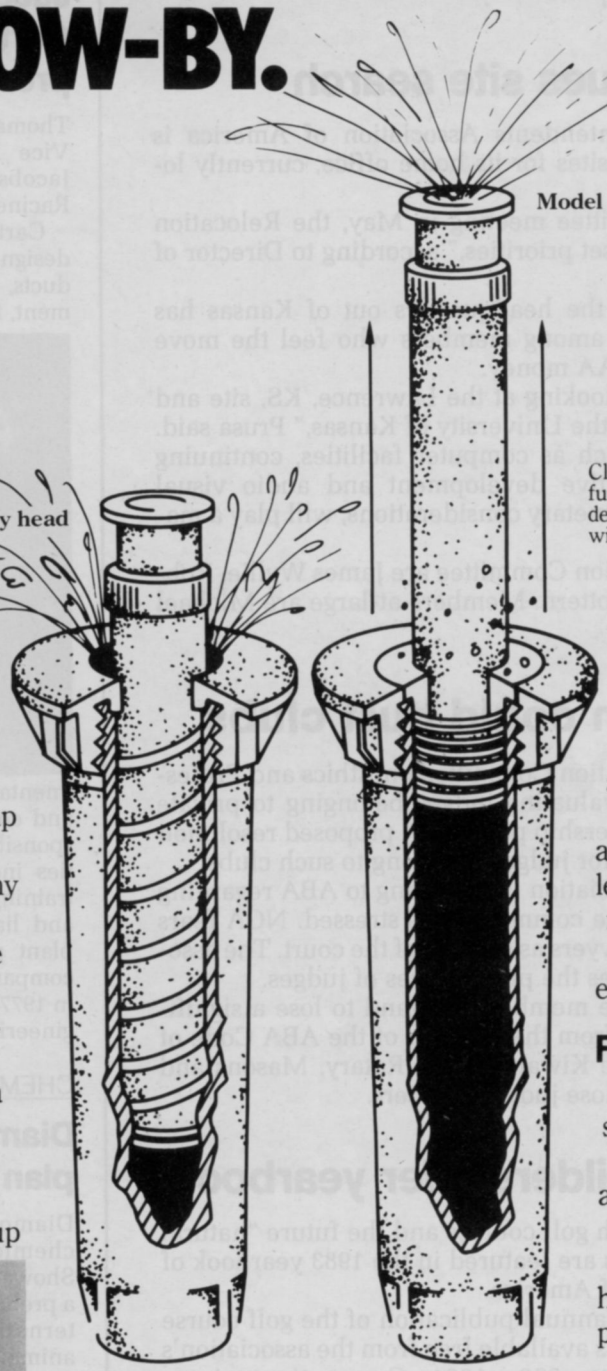
"Oscar is a tough act to follow," he said. "I've worked with him for the past 10 years and have learned a great deal, though."

Allen Haws, sales manager of Specialty Products for Mobay and who has known Benson for the past 15 years, respected him as a "sounding board and a man who did his best all the time."

"Oscar was genuinely interested in the business and was extremely conscientious. He will be missed," said Haws.

Morgan Is New ALCA Manager. *The Associated Landscape Contractors of America selected Gail Morgan, formerly ALCA Director of Programs, to become its new executive director. Before joining ALCA, Morgan was the manager of a 3,500 member recreational facility in Arlington, VA. ALCA membership currently stands at 885.*

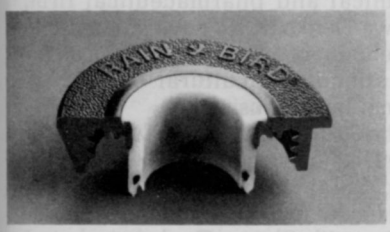
A HEADS UP APPROACH TO FLOW-BY.



Watching a full line of spray heads refusing to pop up and seal is one of the most frustrating experiences for any irrigation professional. It's especially annoying when the culprit—excess flow-by—interfers with a system that's been designed to deliver a precise flow rate of water at a given time.

Unique wiper seal.

Rain Bird takes a heads up approach to this aggravating problem with the introduction of a unique multi-function wiper seal. Co-molded into the stem of each 1800 Series high-pop spray head, the seal arrests flow-by at a low 8 psi.



Unique multi-function co-molded wiper seal arrests flow-by.

The new seal assures precise specification uniformity at all times, even at marginal pressures. And the unique action of the multi-function seal lets Rain Bird use the strongest retract spring in the industry to assure positive pop-down even in sandy soil.

Family of high-pops.

The Rain Bird 1800 Series spray heads are available in 2", 4", 6" and 12" heights to accommodate special watering requirements of low shrubs, new, taller turfgrass cutting heights, and higher freeway and parkway ground covers.

The 6" and 12" spray heads have special labor-conserving benefits, including side inlets to permit shallower trenching and patented pinpoint ratcheting devices for easy directional adjustment.

For more information about the complete line of Model 1800 Series high-pops, write Rain Bird, 145 N. Grand Ave., Glendora, Calif. 91740.

RAIN BIRD®

Circle No. 126 on Reader Inquiry Card

GOLF UPDATE

GCSAA continues site search

The Golf Course Superintendents Association of America is continuing its analysis of sites for its home office, currently located in Lawrence, KS.

At its Executive Committee meeting in May, the Relocation Committee continued to "set priorities," according to Director of Education Jim Prusa.

Suggestions of moving the headquarters out of Kansas has caused some controversy among members who feel the move would be a waste of GCSAA money.

"The committee began looking at the Lawrence, KS, site and the resources available at the University of Kansas," Prusa said.

University resources such as computer facilities, continuing education support, executive development and audio visual capabilities, because of monetary considerations, will play a major role in site selection.

Members of the Relocation Committee are James Wyllie, Robert Osterman and Riley Stottern. Members-at-large are Michael Heacock and Jim Taylor.

Ethics revision could hurt clubs

The American Bar Association Committee on Ethics and Professional Responsibility is evaluating judges belonging to private clubs with selective membership policies. A proposed resolution would make it a violation for judges to belong to such clubs.

The National Club Association is appealing to ABA regarding the "perception of bias" the committee has stressed. NCA fears the ban might extend to lawyers as officers of the court. The association says the rule violates the private lives of judges.

Golf clubs with selective membership stand to lose a significant number of members from the revision of the ABA Code of Ethics. Groups such as the Kiwanis, Elks, Rotary, Masons and Junior League would also lose judge members.

Golf Course Builders offer yearbook

Grass seed mixtures, British golf courses and the future "natural look" for American courses are featured in the 1983 yearbook of the Golf Course Builders of America.

The 44-page booklet, an annual publication of the golf course builders trade association, is available free from the association's Washington office, Suite 638, 1001 Connecticut Ave., Washington, D.C. 20036.

Larry Vetter, a turfgrass management specialist and a former golf course superintendent, discusses correct seed mixtures to achieve better quality at less cost. Vetter is manager of the Medalist Turf Products Division of the Northrup King Co., Minneapolis.

Arthur Jack Snyder, president of the American Society of Golf Course Architects, writes on the new look he anticipates for future American golf courses.

Howard Swan of Golf Landscapes Ltd., Brentwood, England, explains the difference between British golf turfgrass and American.

NEWS *from page 8*

INDUSTRY

Jacobsen promotes Carter to vice presidency

Thomas M. Carter has been appointed Vice President of Engineering for Jacobsen Division of Textron Inc., Racine, WI.

Carter will continue to direct the design and development of new products, enhancement of current equipment, field and in-plant testing, exper-

imental programs, and cost analysis and comparisons. He will also be responsible for all Field Service activities including the company's factory training school, Field Service clinics and liaison with distributors and in-plant publications. Carter joined the company as Manager of Engineering in 1977 and was named Director of Engineering in 1980.

CHEMICALS

Diamond, Japanese plan joint venture

Diamond Shamrock and a Japanese chemical and pharmaceutical firm, Showa Denko, K.K., have entered into a preliminary agreement to form an international agricultural chemicals/animal health business.

The 50/50 joint venture will consolidate Diamond Shamrock's world-wide agricultural chemicals interests, animal health business and research facilities with Showa Denko's technical and marketing expertise. The Japanese firm's monetary investment was not disclosed.

The joint venture is subject to execution of a definitive agreement and approval from the appropriate U.S. and Japanese government agencies. A definitive agreement is expected to be reached in mid-1983.

continued on page 14

CUSHMAN INVENTS A NEW GRASS GROOMING SYSTEM

Mow cleanly, catch all the clippings and then dump them, without ever leaving your seat!

The computer designed 60" high-lift cutting deck combined with the "Grass Caddy" vacuums up clippings and litter for professional well groomed turf.

The operator can see when the big 16-bushel hopper is full. He then dumps it hydraulically into a container or pickup bed as high as 4½ feet, without ever leaving his seat. The "Grass Caddy" gives you clean and continuous service and gets you back into the mowing sequence fast. There is no separate engine or blower to maintain; one reliable Cushman-built power plant does it all.

There's no mower on the market to match it. When you want well-groomed turf fast and economically, nothing compares to the Cushman Grass-Grooming System.

For a free demonstration on your grounds, contact your Cushman Dealer or call us toll-free 1-800-228-4444.

CUSHMAN®

Front-Line™ Grass Caddy

CALL TOLL-FREE

800-228-4444

P.O. Box 82409
3506 Cushman
Lincoln, Nebraska 68501

© Outboard Marine Corporation, 1983. All rights reserved.

30-day control of dollar spot, fusarium blight, and anthracnose is no longer a small miracle.

BN83702

With BAYLETON, it's par for the course.

When it comes to these common fungus diseases, ®BAYLETON Fungicide is uncommonly effective.

Apply BAYLETON according to label directions and you get lasting control of dollar spot, fusarium blight, and anthracnose. Control that lasts a full 30 days, sometimes longer.

BAYLETON is more than a contact fungicide, more than a systemic fungicide with only foliar activity. With BAYLETON, you get contact action plus systemic action with both foliar and root uptake. The result is unequalled staying power and the broadest spectrum of control available in one product.

BAYLETON not only gives you 30-day control of dollar spot, fusarium blight, and anthracnose, but also combats brown patch, copper spot, powdery mildew, red thread, rusts, smuts poa annua decline, pink snow mold, and grey snow mold.

BAYLETON is a Reg. TM of the Parent Company of Farbenfabriken Bayer GmbH, Leverkusen.

With its excellent efficacy and lasting residual action, BAYLETON requires fewer applications and is more economical than ordinary fungicides. Your turf chemicals distributor has it.

MOBAY

Mobay Chemical Corporation
Agricultural Chemicals Division
Specialty Products Group
Box 4913, Kansas City, MO 64120

Circle No. 119 on Reader Inquiry Card

LANDSCAPE UPDATE

Robertson director of programs

Linda A. Robertson has been appointed Director of Programs and Administration for the American Society of Landscape Architects.

Robertson, formerly ASLA's director of membership and chapter services, will be responsible for coordinating ASLA annual meetings, professional awards programs and educational seminars. Robertson replaces William W. Oyler who resigned from ASLA in February.

ASLA also announced the appointments of Teresa M. Morris, formerly membership coordinator, as director of membership; Anne M. Tierney, formerly project coordinator, as director of chapter services; and Ned Flaherty, formerly ASLA's automated systems consultant, as manager of information systems and landscape architecture bookstore.

For pricing and additional information, write Associated Landscape Contractors of America, 1750 Old Meadow Road, McLean, VA 22102, (703) 821-8611.

NLA elects new directors, officers

At the 44th annual meeting of the National Landscape Association, Joe Wayman of Forrest Keeling Nursery, Elsberry, MO, was elected the association's president and Robert Siebenthaler of The Siebenthaler Company, Dayton, OH, was elected its vice president. NLA's new secretary-treasurer is Denny Church of the D.R. Church Landscape Co., Addison, IL.

Directors elected for two-year terms are: Robert Siebenthaler, Richard Campbell of Campbell's Nursery & Garden Center, Lincoln, NE; and Wayne Hardy of Vista Landscaping, Orlando, FL. Gerald Harrell of Landscapes Unlimited, Houston, TX, was elected director-at-large.

ALCA tape offers irrigation basics

Contractors can learn about design and installation of landscape irrigation systems through a one hour, color, video tape called "Basic Landscape Irrigation" from the Associated Landscape Contractors of America. The program covers the basic essentials that need to be considered before undertaking the design and installation of an irrigation system.

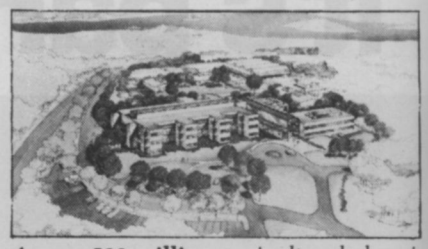
The videotape follows a professional contractor on a job from beginning to end. The tape shows how to measure and stake a project, install a complete system, flush it out and final fine-tuning adjustments to put it into operation.

Also included on "Basic Landscape Irrigation" is basic concepts of designing an efficient irrigation system. There are examples of various types of systems and treatments for different irrigation situations like lawns, groundcovers, flower beds, slopes, planters and other areas that need special consideration. The tape also examines in detail the various components such as sprinklers, drip equipment, valves, controllers, pipe and fittings and explains their operation, function and application in the system.

NEWS *from page 10*

For the last 15 years, Showa Denko and Diamond Shamrock have been in a joint venture in Japan for the production and sales of the fungicide, Daconil.

Diamond Shamrock's agricultural chemicals and animal health sales are expected to reach $260 million in 1983 with operating profits of about $40 million.



A new $38 million *agricultural chemicals research facility to be located in Richmond, CA, will consolidate the research and development activities of Chevron Chemical Company's Ortho divisions. The new facility, to be called Ortho Research Center, will comprise a two building complex enclosing 135,000 square feet. The new scientific complex is scheduled for completion and occupancy in 1985.*

TURF

New York State turf field day set

Cornell University and the New York State Turfgrass Association will cosponsor a turfgrass field day June 21 at the Turfgrass Field Laboratory, Ithaca, NY.

The all day program includes turfgrass management, diseases, fungicides, insect problems, insecticides, growth regulators, wetting agents and weed control. For more information, contact Dr. A Martin Petrovic, Plant Science Bldg., Cornell University, Ithaca, NY 14853.

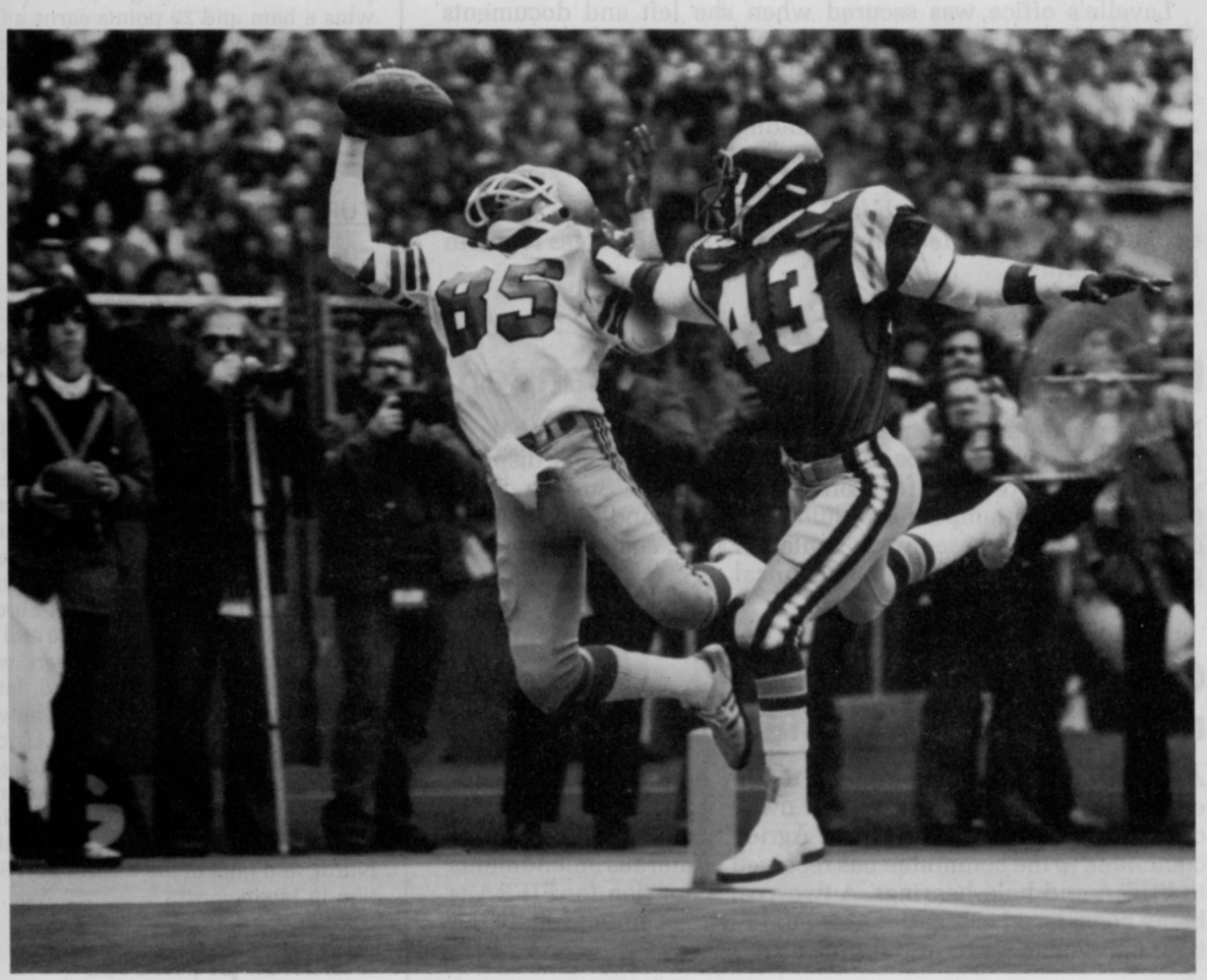
SEED

Turf-Seed sponsors Blue Tag promotion

Turf-Seed, Inc. of Hubbard, OR is sponsoring a Blue Tag Promotion that is offering a free Oregon Deep Sea Salmon fishing trip, gourmet Hubbard hams and Oregon Products Gift Packs. Prizes will be awarded based on the total number of points accumulated during the promotion. Points will be awarded for each Oregon Blue Tag

continued on page 16

Does anyone's career depend as much on timing as a turf manager's does?



Possibly.

Pennfine Perennial Ryegrass covers more ground than any other turfgrass variety in the world. This message recognizes the people who made it happen.

For your free full-size (22" x 28") poster of this ad, send your name and address to:
Pennfine Poster # 5, P.O. Box 923, Minneapolis, MN 55440. (Watch for the other five ads in this series.)

Circle No. 125 on Reader Inquiry Card

GOVERNMENT UPDATE

EPA, White House mix Superfund with politics

The resignation of Ann Gorsuch Burford and the installation of William Ruckelshaus as EPA Administrator overshadowed discoveries by a Congressional Subcommittee of political cooperation between Rita Lavelle, fired head of the hazardous waste program, and White House staff.

Lavelle's office was secured when she left and documents were found that indicated Lavelle met with White House aide James Medas in July 1982 to discuss how Superfund spending could be manipulated to help out candidates in close races for reelection. One example is the funding provided to Massachusetts months before the election to help former Governor Edward King.

Lavelle and Burford both face contempt charges. The subcommittee hopes to call Medas to testify to explain the notes found in Lavelle's office.

Label disposal guidelines expanded

New pesticide storage and disposal requirements for labels of pesticides have been expanded to include a mandatory disposal warning and directions for storage and disposal. Storage directions will cover temperature, humidity and handling. Disposal directions will be based upon container type, such as aerosol or plastic containers, and type of chemical.

Change in EPA leaders may delay FIFRA changes

A temporary hold on amendments to FIFRA until new EPA leadership has had time to make their own suggestions is being discussed by members of the House Agriculture Committee. A subcommittee to the committee has received numerous amendments to FIFRA and held hearings. A two-year extension for FIFRA is being considered giving the new administrator time to study the issues and changes required in FIFRA.

Caribbean Initiative reintroduced

The Senate Finance Committee has been holding hearings on Senate Bill 544, known as the Caribbean Basin Initiative. The bill passed the House prior to adjournment but was not considered by the Senate. The bill seeks to exempt nursery products from a duty-free status allowed to Caribbean growers. Leather and sugar have already been exempted from the duty-free status. The Interior Plantscape Association and the American Association of Nurserymen are supporting the bill.

NEWS *from page 14*

saved that carries the variety name or seed mixture of a Turf-Seed, Inc. proprietary. Different seed kinds carry different point values. Varieties and mixes participating in the Blue Tag promotion and the corresponding point values are:

CBS, 1; Citation, 1; Omega, 1; Birdie, 1; Oregreen, 1; Birdie II, 1; Manhattan II, 1; Columbia, 2; Shasta, 2, Midnight, 2; N-535, 2; Fortress, 2; Shadow, 2; Waldina, 4; Aurora, 4; and Olympic, 1.

Each participant who accumulates any combination of tags valued at 2,000 points wins the fishing trip; 100 points wins a ham and 25 points earns a Gift Pack. Qualifying turf associations may redeem blue tags for cash at the rate of $.50 per point. This program will have an initial run of three years. Tags can be saved from year to year.

TURF

Bidwell joins Tee-2-Green Corp.

The Tee-2-Green Corporation is sponsoring former golf course superintendent Warren Bidwell as speaker for local GCSAA chapter meetings and state agricultural schools offering a turf seminar program to discuss the merits of Penneagle and Pencross Bentgrass. Bidwell has over 52 years experience in turfgrass. His career has been varied, including major construction and landscaping. He was sent abroad by Tee-2-Green in 1974, '76, '80 and '81 to acquaint fellow turf growers with the merits of Penncross and later, Penneagle. On two occasions, he was guest lecturer at the South African Greenkeepers and Club Managers Associations, the 4th and 6th Australian Turf Conferences and the New Zealand Turf Seminar at Palmerston North, and later at the Kansai Turf Station in Japan.

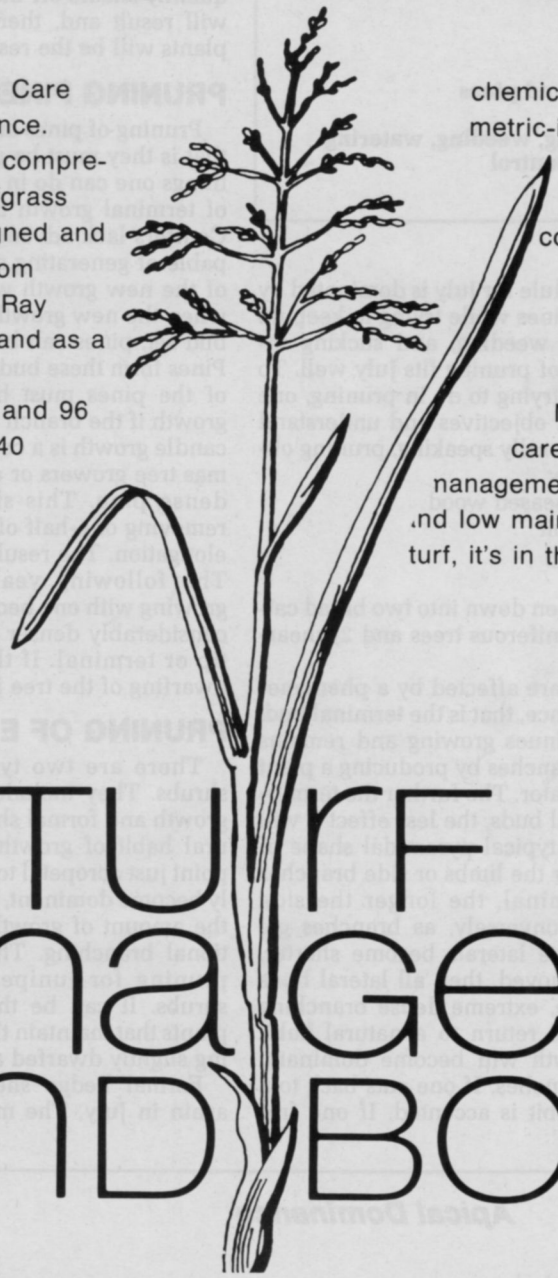
Stauffer promotes Wissmiller in sales

Stauffer Chemical Company has named James E. Wissmiller national sales manager for the company's Agricultural Chemical Division.

For the past four years, Wissmiller has served as director of marketing for Stauffer Produtos Quimicos Ltda., Sao Paulo, Brazil, a wholly-owned Stauffer subsidiary. Since joining Stauffer in 1970, Wissmiller has also held positions in agricultural chemical sales and sales management. In his new position, Wissmiller will be located at the company's Westport, CT headquarters.

Finally, An Aid For Teaching Turfgrass

Superintendents, Contractors, Lawn Care Managers, New, On-the-Job Reference.
The Turf Managers' Handbook is a comprehensive, organized approach to turfgrass science and care. It has been designed and written by leading turf specialists from Purdue, Dr. William Daniel and Dr. Ray Freeborg, for on-the-job reference and as a text for students.
The book contains 150 illustrations and 96 color photographs. Data includes 240 tables and forms. Included are specifications for rootzones, employment, calculations for chemical applications, and extensive metric-imperial conversion. Business and technical aspects of turfgrass management are covered in this 424-page book. Planning, purchasing, hiring, construction, and plant selection are put together for easy on-the-job reference.
Markets covered include lawn care, sod production, golf course nanagement, cemeteries, athletic fields, nd low maintenance areas. If it concerns turf, it's in the Turf Managers' Handbook.



TURF managers' HANDBOOK

Ordering Information

Please send _____ copies of the hardback ($23.95* ea.)
_____ copies of the paperback ($18.95* ea.)

*Please add $3.00 per order plus $1.00 per additional copy for postage and handling.

A check or money order for _____ is enclosed.

Please charge to my Visa, Master Card or American Express (circle one)

Account Number_____ Expiration Date_____

I understand that delivery may take six to eight weeks. Quantity and bookstore rates available upon request.

Signature _____

Name (Print) _____

Address _____

City _____ State _____ Zip _____

Send to:
Book Sales
Harcourt Brace Jovanovich Publications
One East First Street
Duluth, MN 55802

HBJ

WTT 63

LANDSCAPE LOG

By Douglas Chapman, Dow Gardens, Midland, MI

JULY JOB FOCUS

1. Shearing hedges and pines

2. Continued mowing, weeding, watering and sucking insect control

The maintenance schedule for July is dominated by shearing of hedges and pines while trying to keep up with mowing, irrigation, weeding, and sucking insects. This shearing type of pruning fits July well. To understand what we are trying to do in pruning, one must remember the main objectives and understand the plant's response. Generally speaking, pruning objectives for plants include:

- removal of dead and diseased wood
- enhance the natural habit
- formal shearing (shaping)
- height maintenance

This shearing can be broken down into two broad categories—1) pruning of coniferous trees and 2) shearing or pruning of shrubs.

Physiologically, plants are affected by a phenomenon called apical dominance, that is the terminal bud, or apical meristem, continues growing and remains dominant over all side branches by producing a plant hormone, or growth regulator. The further the terminal is away from the lateral buds, the less effect it will have and, therefore, the typical pyramidal shape of trees, meaning the further the limbs or side branches are away from the terminal, the longer the side branches will be and, conversely, as branches get closer to the terminal, the laterals become shorter. Once this terminal is removed, then all lateral buds will break and, therefore, extreme dense branching can occur but allowed to return to a natural habit again, the terminal growth will become dominant, thus suppressing side branches. If one cuts back to a bud, then the natural habit is accented. If one frequently shears off the terminal, no apical dominance will result and, therefore, dense shaped hedges or plants will be the result.

PRUNING PINES, CONIFERS

Pruning of pines and other conifers is time specific, that is they must be pruned in July. Further, the only things one can do in pruning is to reduce the amount of terminal growth or completely remove a branch. Conifers lack adventitious tissue, or lateral buds, capable of generating suckers. Thus, complete removal of the new growth will result in a dead branch. But when the new growth is in the "candle stage" prior to bud set, pines can be pruned and new buds will set. Pines form these buds once a year; therefore, pruning of the pines must be confined to current season's growth if the branch is to be retained. Shearing of the candle growth is a common technique used by Christmas tree growers or anyone trying to produce a thick dense pine. This shearing is nothing more than removing one-half of the candle during the period of elongation. The result is the formation of many buds. The following year these many buds continue growing with one becoming dominant, but the plant is considerably denser with extensive branching at the tip or terminal. If this practice is continued, then dwarfing of the tree is the result.

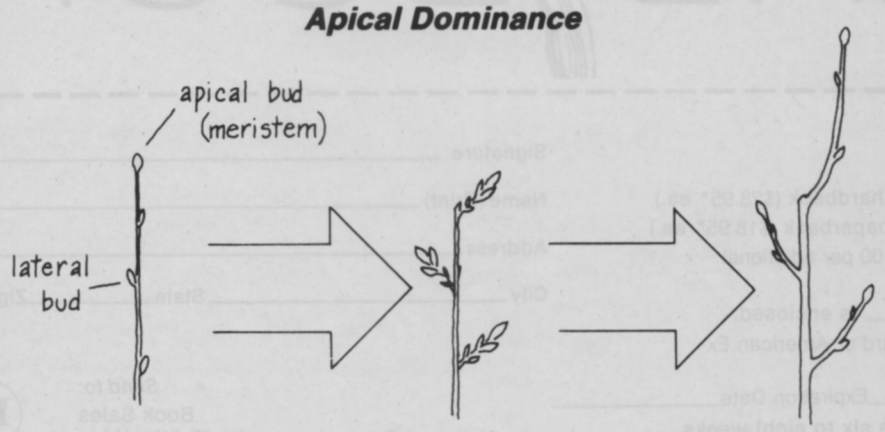
PRUNING OF EVERGREEN SHRUBS

There are two types of pruning for evergreen shrubs. They include accenting the natural habit of growth and formal shearing. When accenting the natural habit of growth, one always prunes back to a point just acropetal to a bud so that bud will eventually become dominant, but one has reduced the plant by the amount of growth removed, while causing additional branching. This is the most difficult type of pruning for junipers, yews, and any deciduous shrubs. It can be the most rewarding, resulting in plants that maintain their own natural habit, while being slightly dwarfed and dense.

Formal hedge shearing is usually accomplished again in July. The most important considerations in formal shaping are: 1) deciding what shape is desired, 2) that this shearing be done at least once and, in the case of yews, twice each year, and 3) that the upper portion of the plants be narrower than the bottom. While shaping hedges, it is important to remember that leaves remain on the plants only when they receive sunlight; therefore, the lower branches should be longer than the upper branches. Often hedges

Continued on page 20B

Apical Dominance



CUSHMAN.®

A SHORT COURSE IN TURF CARE ECONOMICS.

PRESENTING THE RUNABOUT AND TURFCART.™

Nobody understands the budget squeeze you're feeling better than Cushman. After all, getting the most work out of every manhour is something Cushman has specialized in for years.

Take the two vehicles below, for instance. On the left is the Cushman Runabout. With an 18-hp OMC engine, it seats two workers and hauls up to 1500 pounds of cargo. A centrifugal clutch is standard, which allows the driver to stop and go without shifting. And a 12-hp model offers even greater economy as well as easy handlebar steering.

On the right is the Cushman Turfcart.™ A 7-hp engine is an economical way to get your crew off their feet and moving. Flip up its rear passenger seat and you've got room for tools, supplies and equipment.

Either way, Runabout or Turfcart, you'll get a vehicle that's easy on gas and easy on the budget.

For free literature and the location of your nearest dealer, call 800-228-4444.

CUT-3-8778

CUSHMAN.® THE WORKING SYSTEM.

5054 Cushman, P.O. Box 82409
Lincoln, NE 68501

CALL TOLL-FREE

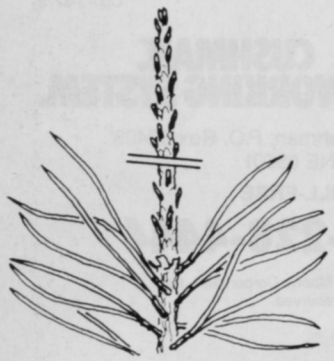
800-228-4444

© Outboard Marine Corporation, 1982.
All rights reserved.

Circle No. 139 on Reader Inquiry Card

LANDSCAPE *from page 20*

Shearing Candle Growth

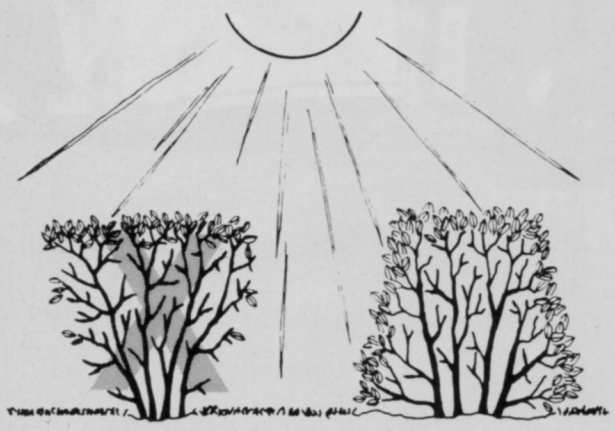


are pruned with the top broader than the base. This results in shading and complete loss of lower leaves. It is, thus, important to remember the effect of sunlight on plants and their ability to retain leaves. Hedges or formal shaped plants should be pruned just after the flush of growth. For some plants, such as junipers, that is once annually. Privets can require three to four shearings each growing season. Yews require pruning twice a year. The order of maintenance from least to most when considering shearing is: juniper—yew—privet.

With the hot weather of July comes two additional tasks: 1) providing added moisture for turf and 2) controlling of sucking insects.

Artificial irrigation is one of the most challenging tasks in maintenance of the landscape. One must clearly understand that it is easier to write about how to correctly irrigate than to actually do the job. Correct irrigation is dependent upon the desired effect, soil type, plant type, and economics (availability of water in your area). It has been generally stated that one should consider applying one-acre inch of water per week to keep a lawn actively growing throughout the summer months. In looking carefully at the objectives and as water becomes more limited, we are beginning to research the use of different grass types which require less water to remain actively growing throughout the summer. Some research will be directed at cool season grasses. The three schools of thought include: 1) grass types that will grow in the southwest; 2) breeding new bentgrass cultivars; and 3) breeding bluegrass that will be drought tolerant. The

Hedges



fact remains that breeding custom-designed turfgrass cultivars for disease resistance and minimal water utilization with maximum growth during doughty months is paramount.

The soil has major impact on how one irrigates. For an extremely light sandy soil, it would not be uncommon to irrigate frequently, that is every other day. But provide no more than one-third to one-half inch of water per application. If a clay loam soil, then one should probably irrigate once a week, providing an acre-inch of water to maintain actively growing turf.

Although insect control will depend on the type of insects that may affect your landscape and the part of the country you are in, certainly during the hot dry periods many trees and shrubs are infested by sucking insects, e.g. aphids and mites. In reference to aphids, one wants to control infested plants by the frequent irrigation where the foliage is thoroughly soaked, often resulting in washing off the insect and, therefore, should control the aphids. As populations increase, there are many chemical alternatives to control, but one should be sure that populations warrant it and that simple syringing is not enough. Mites are another insect where as the temperature increases, they more rapidly grow and their life cycles, therefore, have potential for population buildup when the temperatures reach approximately 80°F. As one sees a slight yellowing or bronzing of the foliage, then a close inspection is worthwhile. If population is significant, then either a miticide to provide long residual protection or an ovicide would be appropriate to control the rapidly growing populations.

July's maintenance log is a month dominated by trying to keep up and shearing of hedges and evergreen trees and shrubs. **WTT**

We Made It Simple

- QUALITY — Built with Swiss clocklike precision.
- LIGHTWEIGHT — With the comfort of the user in mind.
- ACCESSIBLE — A durable self-lubricating and external pump assembly.
- SIMPLICITY — Insures cleanliness and longer wear. No tools necessary to dissemble and repair.
- PRICING — Here's one instance where you pay less for the be

5 GAL. (20 K)
ALSO AVAILABLE IN
2½ GAL. (10 K)
3½ GAL. (15 K)

BIRCHMEIER

has the Back Pack Sprayer for you —

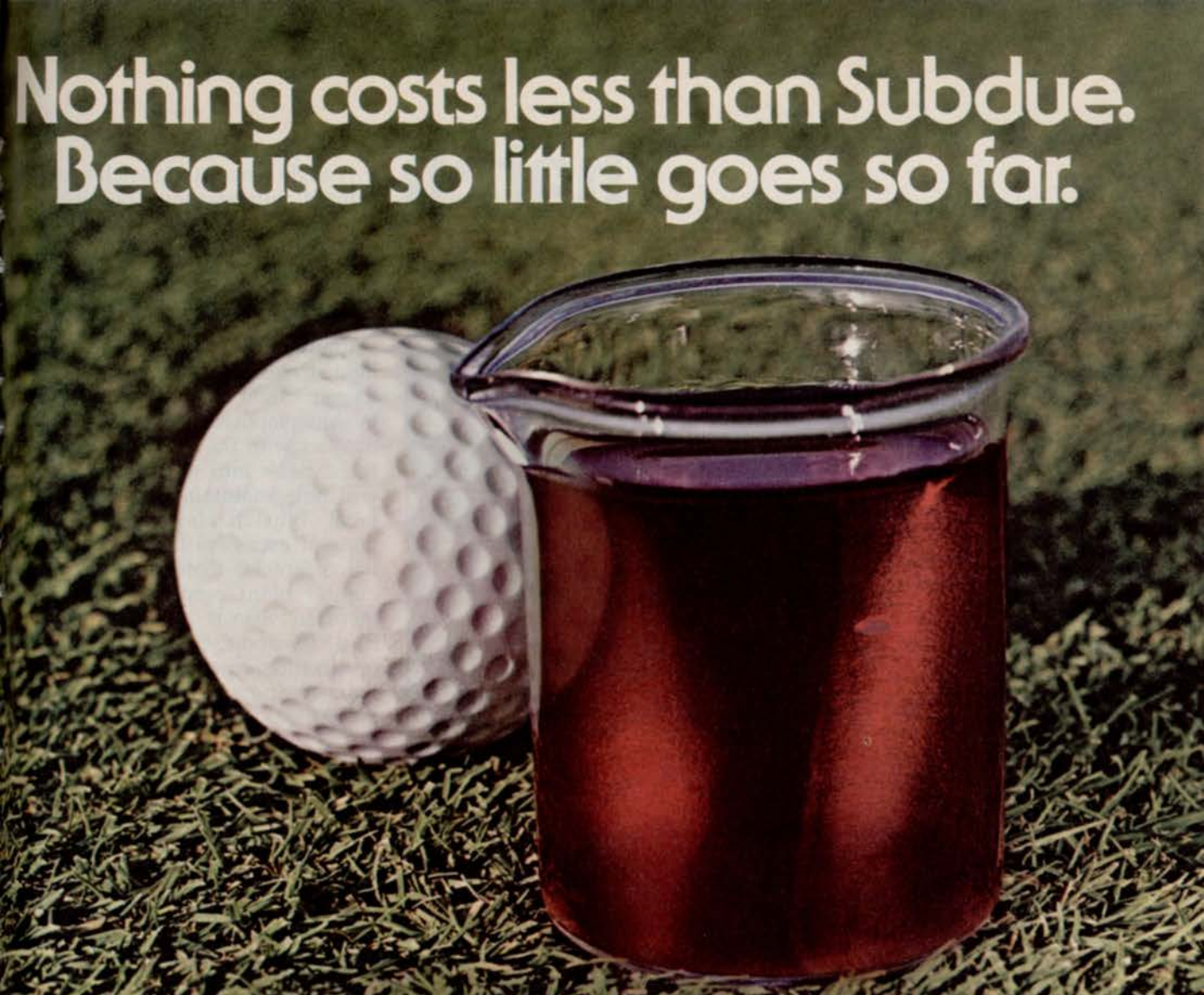
FOR MORE INFORMATION

TREBOR CORPORATION

4047-A JONESBORO ROAD • FOREST PARK, GA. 30050 • 404-366-0957

Circle No. 134 on Reader Inquiry Card

Nothing costs less than Subdue. Because so little goes so far.



Subdue gives turf the best protection against Pythium blight and damping-off for the least cost.

Nothing costs less to use than Subdue® to control Pythium blight and damping-off. Because it only takes 1½ fluid ounces of Subdue to cover 1,000 square feet for 10 to 21 days, on established turf.

And nothing works as well because Subdue has two-way action against Pythium blight and damping-off. First, Subdue works systemically, to protect your turf from the inside out. Second, Subdue works on contact to control Pythium in the soil.

Subdue will give you control in both established turf and newly-seeded turf. And Subdue's systemic action gives you longer-lasting control than other fungicides. So you not only save on Subdue's low rate, you also save on maintenance and labor costs.

That's why Subdue is the best protection you can get. Because so little goes so far.

Ciba-Geigy, Ag. Div., Box 18300, Greensboro, NC 27419

CIBA–GEIGY

© 1982 Ciba-Geigy Corporation

Circle No. 219 on Reader Inquiry Card

Thatch Management

Core cultivation offers less turf disturbance than vertical mowing or renovation.

By Karl Danneberger

Thatch is a natural by-product of highly maintained turfgrass systems. These systems would include intensively managed homelawns and golf courses. The definition of thatch is a tightly intermingled layer of living stems, leaves, and roots that develops between the zone of green vegetation and the soil surface (1). The degree of thatch accumulation is related to the turfgrass cultivar's growth rate, the amount of nitrogen used, and the use of certain pesticides (4,6).

A slight amount of thatch is considered advantageous because it provides resiliency, increases wear tolerance, and insulates the soil against temperature extremes (1). In situations of minimal thatch accumulation (less than ½ inch), preventative cultural practices such as light, frequent applications of nitrogen; light, frequent vertical mowing; topdressing; and core cultivation with the cores reincorporated back into the thatch layer will help maintain an acceptable level of thatch. However, in situations of excessive thatch accumulation (greater than 1 inch), detrimental plant responses such as increased disease incidence, localized dry spots, poor response to fertilization, susceptibility to injury from temperature extremes and proneness to scalping are associated with it [1]. Under these conditions, maximum effort should be made to reduce the thatch layer.

Four major means of managing thatch are 1) complete removal of the thatch layer and the associated turfgrass community followed by reseeding or resodding the area, 2) heavy applications of soil topdressing, 3) vertical mowing, and 4) core cultivation with the cores reincorporated. The complete removal of the thatch layer and establishment of a new turf, to say the least, is a very effective method for controlling thatch but not very feasible for many homeowners or golf course superintendents. Topdressing, the application of a soil mix to a turf surface, is an excellent method for controlling thatch and is well adapted to golf course greens and tees but is not very practical for the majority of homelawns and golf course fairways. Vertical mowing and core cultivation with the cores reincorporated back into the thatch layer are the most widespread and practical means for managing thatch.

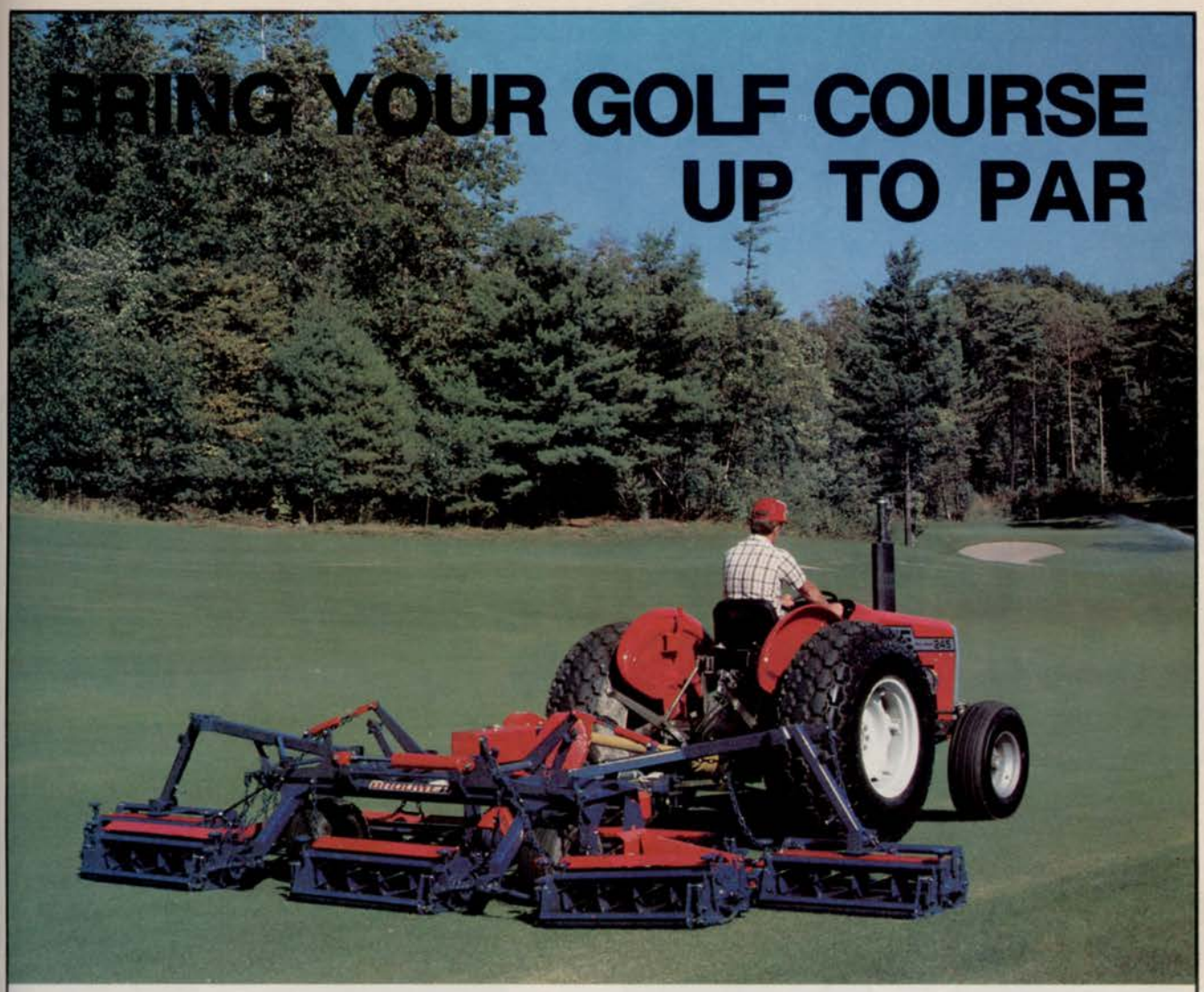
Vertical mowing

Vertical mowers are composed of either fixed or free swinging blades that operate in a vertical plane. For thatch control, the blades are set so they just barely

continued on page 26

Karl Danneberger was graduated from Purdue University with a degree in agronomy and from the University of Illinois with a Masters in horticulture. He is currently working on his Ph.D. in plant pathology under Dr. Joe Vargas at Michigan State University.

BRING YOUR GOLF COURSE UP TO PAR



With The Brouwer Golf Course Mower

- Designed to give your Golf Course a beautiful, consistent cut.
- Simple "No Wheel and Gear Drive" prevents tracks - ideal around sand traps.
- The "Floating Head" follows contours and provides an even cut without scalping.
- Economical to buy at 1/3 the price of self propelled mowers.
- Choice of blades per reel.
- Single lever control raises or lowers your mower for fast and easy transport.
- Available in 3-5 & 7 gang units.

"The Brouwer Golf Course Mower is far superior to anything I've ever used. As a result my fairways have never looked better."

Gord Evans
Pheasant Run Golf Club
Newmarket

BROUWER
TURF EQUIPMENT LIMITED

7320 Haggerty Rd./Canton, MI., U.S.A. 48187 Telephone: (313) 459-3700
Woodbine Avenue/Keswick, Ontario, Canada L4P 3E9 Telex 065-24161 Telephone: (416) 476-4311

Circle No. 101 on Reader Inquiry Card

Bye-Bye

New Rubigan™ spells curtains fo
And then some.

Rubigan™ turf fungicide serves notice. Because, after extensive testing, Rubigan has proven to be remarkably effective in evicting unwanted fungi that give any golf course an unfair handicap.

Broad spectrum control.
Dollar spot (even fungicide resistant strains), large brown patch, fusarium blight, stripe smut and pink or gray snow mold—these tenants might as well start thinking about a forwarding address. And if others are lurking in the neighborhood, Rubigan is compatible with most contact or systemic fungicides commonly used on turf.

Preventive and curative action.
Rubigan provides you with the flexibility to manage a disease prevention program and, at slightly higher rates, provides curative action on dollar spot and large brown patch. More to the point, Rubigan acts as an enforcer that prevents turf diseases from making themselves feel at home on tees, greens and fairways.

Unlikely development of resistance.
Rubigan has a mode of action involving three or more sites of inhibition (a multi-site inhibitor). Years of successful use outside of the U.S., as well as trial usage in the U.S., have shown that susceptible fungi commonly found in turf have not been able to develop resistance to Rubigan.

Longer-lasting control.
Rubigan is a very active, concentrated product. Long lasting c trol allows for longer interva between spraying. You can r duce the number of application tri and save on fuel and labor costs. What's more, lower use rates mea less storage and lower handling co

Rapid leaf penetration.
Rubigan is a foliar-applied, locally s temic fungicide. It's absorbed al most immediately into leaf tissue a isn't susceptible to washoff by rai or irrigation once the spray has dri While the spray is drying, the activ ingredient sets up shop inside the plant where it can't be washed o Disease protection begins immed ately after application.

Excellent turfgrass safety.
No adverse effects or discoloratio

Rubigan™ EPA Experimental Use Permit No. 1471-EUP-50.

Fungi.

ive major turf diseases.

ccurs when Rubigan is used at ecommended rates. Your university urfgrass research personnel will ell you that Rubigan is as beneficial n your turf as it is destructive for five ajor turf diseases. For more information on cost-efficient Rubigan, ontact your distributor or write: Elanco Products Company, 40 S. Alabama St., Dept. E-455, ndianapolis, Indiana 46285.

Precautions: Applications of RUBIGAN to turfgrass areas containing Poa annua (annual bluegrass) may result in the gradual reduction of this species from the turfgrass area. Cumulative dosages of 5 pounds of RUBIGAN 50W per acre or 2 ounces per 1,000 sq. ft. are usually necessary for this response to occur. Turfgrass areas containing Poa annua which cannot tolerate its reduction should not be treated with RUBIGAN.

Rubigan. It's spreading.

For best results, always read and follow the label directions.

Rubigan™ (fenarimol, Elanco Products Company)

Circle No. 109 on Reader Inquiry Card

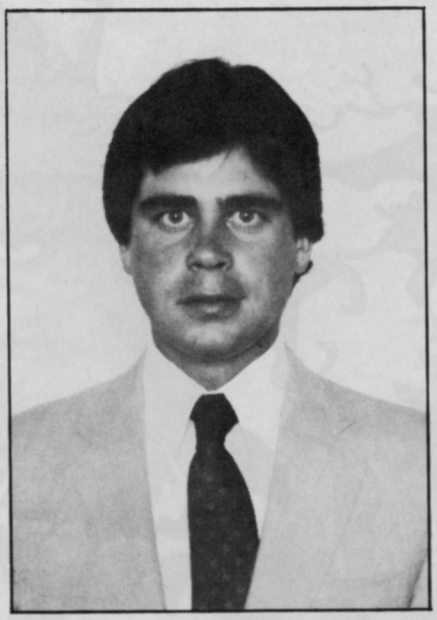
touch the soil surface. Vertical mowing is currently the most popular method for controlling thatch. However, vertical mowing is a very intensive operation that results in disruption of aesthetic qualities of the turf, and in golf course situations, disrupts the playing surface. Vertical mowing will cause severe stress to the turfgrass community.

Research at the University of Illinois showed that in some instances of excessive thatch accumulation, the thatch layer becomes the primary growing medium for the turfgrass community (4). The crown of the turfgrass plant is no longer in contact with the soil surface but elevated into the thatch. Subsequent development of rhizomes and stolons, along with the majority of roots, occurs within the thatch layer. Under this type of situation, vertical mowing will not only remove the thatch and a large portion of the turfgrass community but inflict severe damage to the remaining turf.

If vertical mowing is to be used, care should be taken. Vertical mowing should be done when environmental conditions favor rapid recovery and in golf course situations when play is minimal.

Core cultivation

Core cultivation or coring is the physical removal of soil cores by means of hollow tines or spoons. The size of the core depends on the tine or spoon used which may vary from ¼ to ¾ inch in diameter and may exceed 3 inches in length. Aerification is a term sometimes used to describe coring. This term is misleading because although a hole is left from coring, compaction or a reduction in air space occurs around and beneath the coring hole (3).



Karl Danneberger

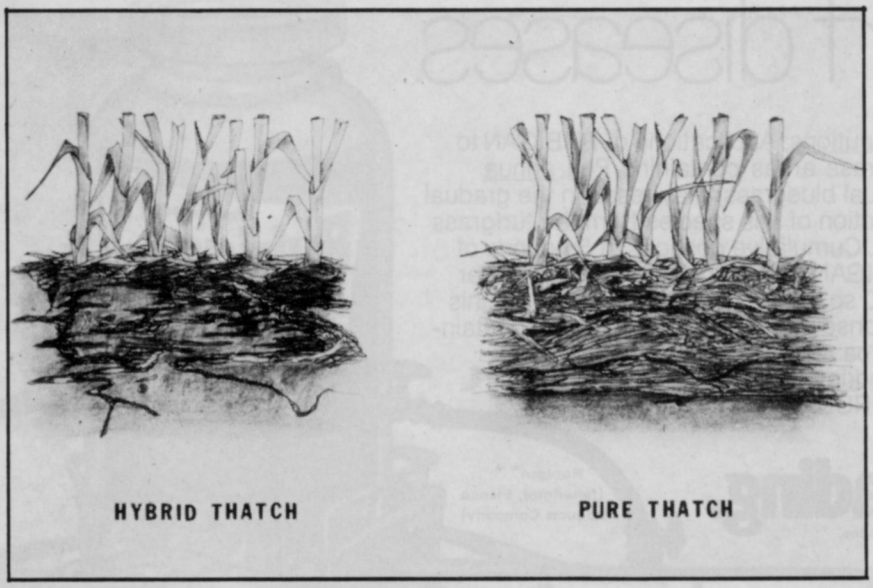
For thatch management, an important part of coring is the reincorporation of the cores back into the thatch layer. Reincorporation of the cores integrates the thatch and soil providing a more favorable environment for thatch reducing microflora. Also, research has shown a favorable change in the physical and chemical properties of the thatch layer with the addition of soil (2). Reincorporation is accomplished by breaking up the cores by means of a vertical mower (in this instance the blades are set so they break the cores but have minimal contact with the turf surface), then dragging the cores into the thatch layer with a mat.

A problem in terminology arises when trying to describe a thatch-soil mix because by definition thatch is void of soil. Various researchers have coined terms such as mat, hybrid thatch, and thatch-like derivative to describe the integration of thatch and soil.

Coring has the additional benefits of providing a favorable environment for root growth and improving the general health of the turfgrass community surrounding the coring hole.

Coring or vertical mowing may encourage weed invasion by opening up the turf to weed seed germination. Cultural practices such as fertilizing should be done as soon as possible to encourage fill-in and recovery of the turf.

In conclusion, thatch management should be an integral part of any turfgrass manager's program. The method used should be carefully selected and implemented properly.



Core cultivation *creates a hybrid thatch which provides more favorable physical and chemical properties. In an older, thatchy turf, a large portion of the root system is in the thatch and vertical mowing can cause severe stress.*

LITERATURE CITED

1. Beard, J.B., 1973. Turfgrass: Science and culture. Prentice-Hall, Inc., Englewood Cliffs, N.J. 658 pp.
2. Danneberger, T.K. 1979. Edaphic properties of thatch and thatch-like derivatives in turf. M.S. Thesis. Univ. of Illinois. Urbana, IL 79 pp.
3. Petrovic, A.M., J.E. Siebert, and P.E. Rieke. 1982. Soil bulk density analysis in three dimensions by computed tomographic scanning. Soil Sci. Soc. Am 46: 445-449.
4. Randell, R.J., J.D. Butler, and T.D. Hughes. 1972. The effect of pesticides on thatch accumulation and earthworm populations in Kentucky bluegrass turf. Hortscience 7: 64-65.
5. Turgeon, A.J., K.A. Hurto, and L.A. Spomer. 1977. Thatch as a turfgrass growing medium. Illinois Research 19(3): 3-4.
6. Turgeon, A.J., R.P. Freeborg, and W.N. Bruce. 1975. Thatch development and other effects of preemergence herbicides in Kentucky bluegrass turf. Agron J. 67: 563-565.

This new Toro® shrub head tackles all the tough jobs!

Sandy or dirty water? No problem with Toro's Super 600® shrub heads

This efficient new shrub head operates in sandy or dirty water, so quality of water source is never a concern. With 4 nozzle sets and adjustable radius, Toro's Super 600 lets you space heads as close as 30′ or as far as 60′. You cover large areas with fewer heads, slashing installation time and costs. The drive assembly is sealed in oil for smooth, quiet rotation. Optional stop valve lets you remove the sprinkler body for cleaning or servicing, *without turning off the water,* while all other heads continue to operate. Toro Super 600 shrub heads, with ½-inch and ¾-inch male bases, make it easy to replace unsightly impacts once and for all!

The Toro Company Irrigation Division
Dept. WT-683, P.O. Box 489, Riverside, CA 92502

TORO®

EXCELLENCE IN IRRIGATION

Circle No. 132 on Reader Inquiry Card

The area around home *plate, the bases, and base paths present major problems due to heavy traffic.*

Baseball Field Renovation

Limited resources, enrollment force schools to renovate fields rather than build new ones.

By Professor H.L. Portz

Baseball fields located in the transition zone have many problems including severe compaction of unmodified soils and wear and loss of unadapted turfgrass species and cultivars. These problems and others are aggravated by poor usage practices and maintenance. In addition, limited resources and lower enrollments indicate most high schools, universities and recreation facilities will have to renovate rather than undertake new construction.

H.L. Portz is professor of agronomy, Southern Illinois University, Carbondale.

This article, therefore, is oriented to the renovation and management of current baseball fields in this unhospitable climatic zone across the middle belt of the United States. It also deals primarily with facilities at educational institutions and recreational areas.

Renovation

Upgrading of several sites near and at Southern Illinois University-Carbondale (SIUC) included major drainage correction and leveling and establishing more-adapted turfgrass species.

Recognizing that many older baseball fields were established for student accessibility rather than a desirable baseball site, first consideration should be given to the soil and drainage and their effect on compaction. Whether native clay soil or disturbed soil and rubble, a baseball field needs good drainage, especially since most school usage is in the spring when

continued on page 32

"WE HAD ENOUGH HORSE SENSE TO BET ON WOODS."

Mr. Tom Stewart, Jr.
Farm Manager
Stoner Creek Stud, Inc.
Paris, Kentucky

"There's a lot of good horses on this farm, but the real workhorse is our Woods mower. For more than 1700 hours it's been running trouble-free over our 1005 acres. It's nice to know we put our money on a winner."

Tom Stewart, Jr.'s enthusiasm for his farm's Batwing Rotary Mower is shared by thousands of satisfied Woods' customers that appreciate its safe, convenient and dependable design features.

The Model HD315 acts much larger than its 15-foot flat-out mowing width, because it will tackle the toughest weeds, clear light brush and shred stalks as well. It cuts any large job down to size, up to 13 acres per hour. With hinged wings that will adapt to most all kinds of terrain.

It also acts much smaller than its size because of its maneuverability. And with all four wheels "inboard" it can cut close to trees, fences and posts. With its wings "up" the HD315 is only 78 inches wide. Perfect for road transport and movement through gates and narrow bridges. It's a winner, and a good investment, from Woods where we've been breeding a line of champion mowers for over 35 years.

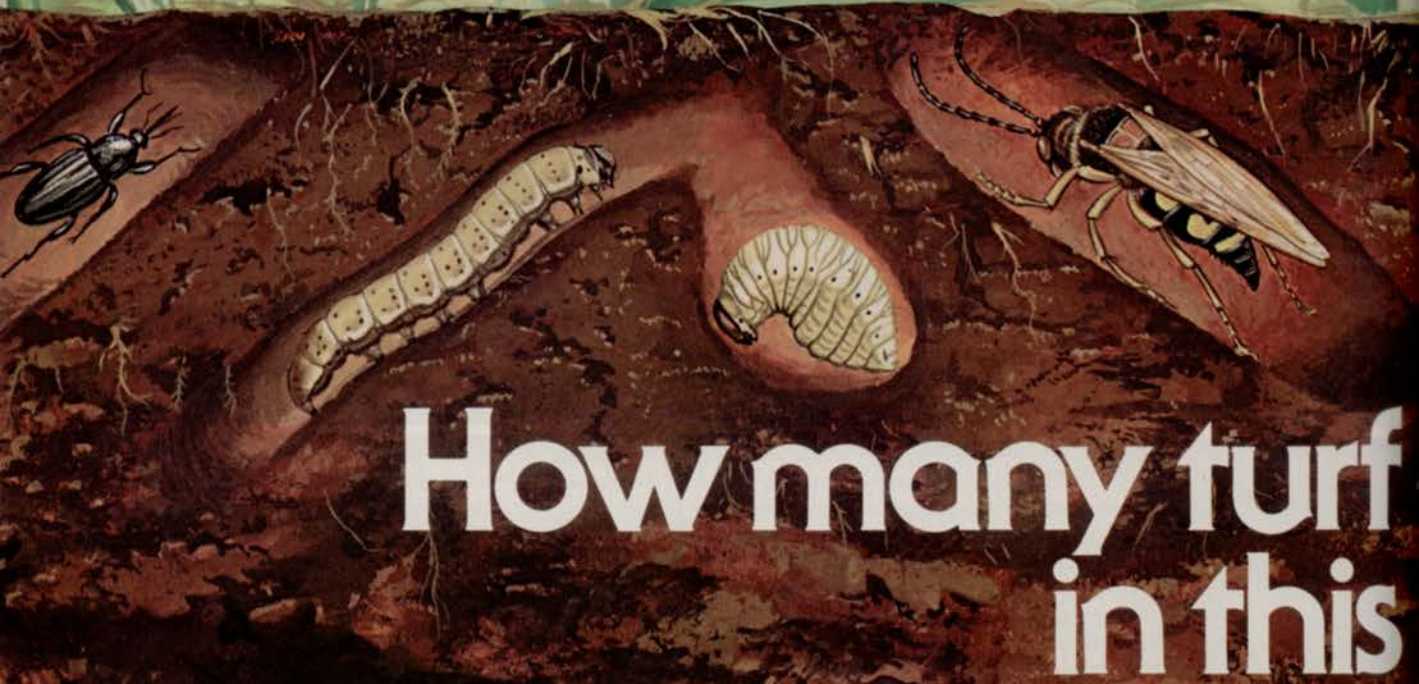
Send for your ***free*** catalog today.

WOODS

Division of Hesston Corporation
Oregon, Illinois 61061

Woods mowers are backed by 35 years of dependable quality.

Circle No. 137 on Reader Inquiry Card



How many turf in this

Here's a clue. D·z·n® Diazinon® controls every insect you see here, from the root-eating white grub to the juice-sucking chinch bug. In fact, D·z·n Diazinon has the biggest label of any turf insecticide. And that makes it the perfect choice for broad spectrum control in both commercial and residential turf.

Need another clue? D·z·n controls damaging worms including

© 1982 Ciba-Geigy Corporation.

Circle No. 218 on Reader Inquiry Card

insects are hiding picture?

cutworms, sod webworms and armyworms. Plus it takes care of nuisance pests like ants, fleas and chiggers.

We've mentioned 8 species on the label but that's not even half.

Keep counting. And when you place your next insecticide order, ask your supplier for the biggest label in the business—D·z·n Diazinon.

PS: You'll find the answer below.

CIBA–GEIGY

Answer: D·z·n Diazinon controls all twenty-three insects seen here.

rainfall is greatest in the Midwest and East. The area around home plate, the bases and base paths and the infield present major problems because of the heavy traffic. If no tile was laid at construction time, one can dig and lay a periphery tile on the outside of the skinned area or one must depend primarily on surface drainage. A combination of both is desirable. For tiling to be effective, one must make sure that water reaches the tile by percolation through the compacted soil or by other means. Harper (2) comments that compaction seals the surface and prevents normal movement of air and water into and through the soil. He indicates that tiling of the entire playing area may be of little value because of surface compaction which impedes water movement into the tile lines.

Using SIUC's Abe Martin Field as a case study, we found that tile had been laid on a 30 ft. grid. About a foot of gravel had been used to cover the tile, silty clay topsoil and subsoil was used to fill the remaining 1½ to 2 feet. In addition, in ten years, a two-inch compacted layer of silt and clay had developed about one-inch below the surface, preventing percolation of water downward and to the tile. The field was unplayable for one to three days after even moderate spring rains.

Also, a ridge had developed in the outfield grass at the edge of the skinned area which prevented water from escaping into the outfield and player positions were easily identifiable by puddles of water. Old, leaky canvases did not help much and could not be left on continuously because of heat, sun exclusion and lack of labor, especially over weekends, holidays and when the team (the canvas crew) was out of town.

After surveying and closely checking the field, several solutions were considered including the following: completely removing infield sod, working in calcined clay to a four inch depth and replacing with new sod and completely reworking the skinned area and incorporating calcined clay; uncovering the tile lines, adding calcined clay or gravel/sand to near surface and resodding and releveling skinned area plus more careful surface raking of skinned area in the future.

Turf Shaper *was one of three implements tested for overseeding with tall fescue at 7 lbs./1000 sq. ft.*

Steps finally recommended for use in fall 1975 were:

1. Remove three sod strips (three feet) along inner edge of outfield.
2. Remove additional soil and deposited infield material with sod cutter to a depth of two to four inches.
3. Trench the whole circle from right to left baselines crossing existing tile. Connect short slit trenches and low area behind 1st base to drain tile along east and west edges.
4. Fill the trench to within three to four inches of the top with creek-run gravel, tamp and top with four inches of a sand/soil mixture (approximates a French drain).
5. Grade skinned area to slope toward the trench and fill the low areas.
6. Resod over the trenches being careful to center a strip of sod over the trench and alternate sod ends.
7. Remove two sod strips from along outsides of 1st and 3rd base paths, remove two to three inches of soil and replace with new sod.
8. Work calcined clay (Turface) into the base paths and skinned area to a depth of two to three inches and relevel with a slope from the infield grass to the outer edges of the base paths and to French drain and outfield grass.

The results were good. Rain and irrigation water surface-drained from grass infield to French drain and then to underground tile. In general, as long as it wasn't raining on the day of a game, they were able to play ball. By 1978, there again was a buildup on the outer edge of infield grass and edge of outfield grass due to soil/calcined clay migration, and fielding positions were obvious in the skinned area. Stripping, lowering of stripped area, releveling of infield and resodding were repeated. This process will be repeated in 1983 or 1984 and whenever needed.

Heavy wear and compacted areas around the pitcher's mound and home plate are routinely resodded, usually every other year in the fall.

Renovation of the SIUC woman's softball field was accomplished in 1980. This field was almost devoid of perennial turfgrasses but had numerous grassy and broadleaf weeds. The renovation steps were:

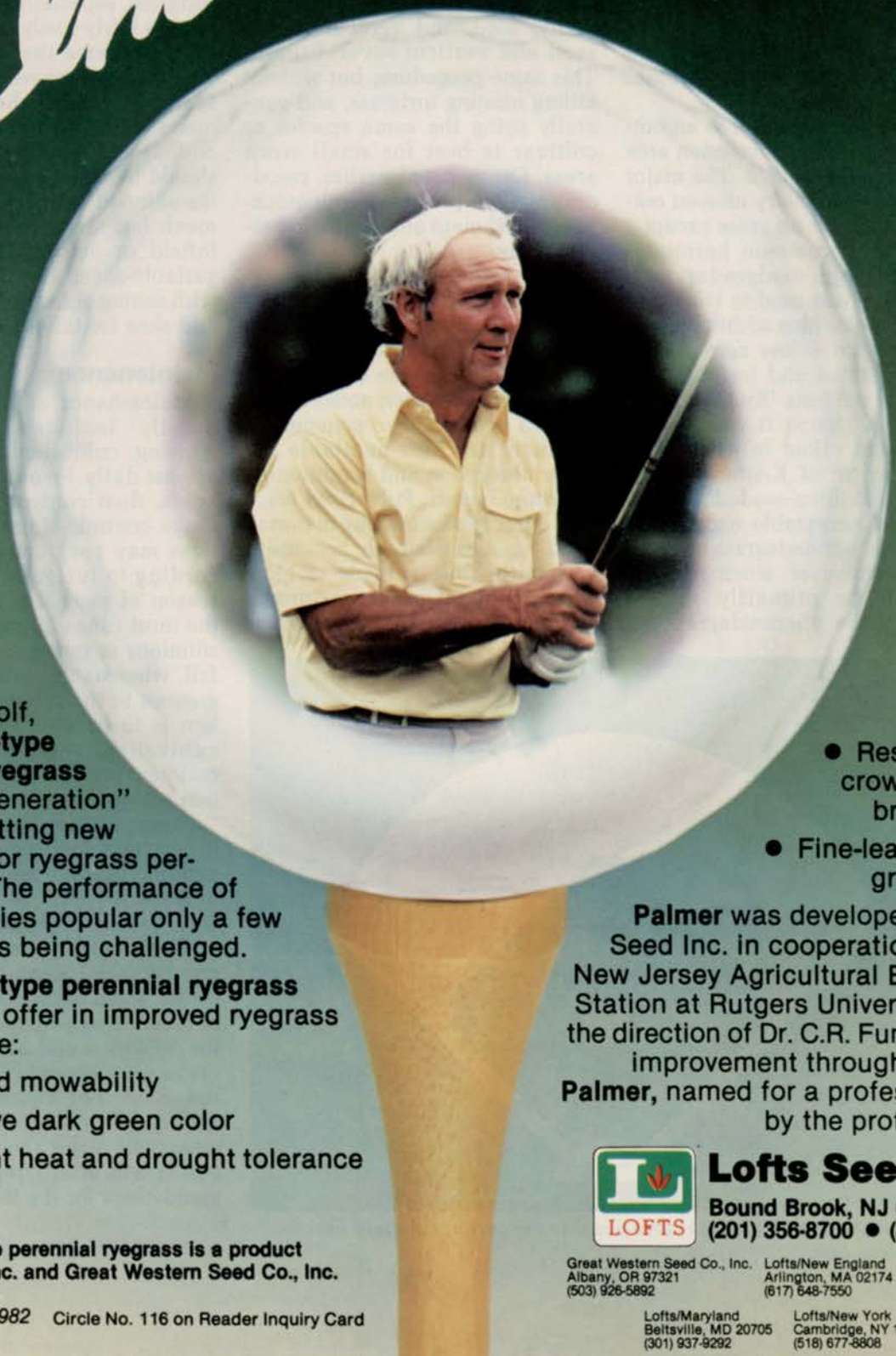
1. Elimination of weedy species with 2,4-D/dicamba on areas with some desirable perennial grasses and glyphosate (Roundup) on the remaining area including the infield.
2. Use of several implements for research purposes including a roto-tiller/seeder combination (Turf Shaper), a flex-harrow

continued on page 34

Palmer

Turf-Type Perennial Ryegrass

the beginning of a second legend



As Arnold Palmer is a legend of golf, **Palmer turf-type perennial ryegrass** is a "new generation" ryegrass setting new standards for ryegrass performance. The performance of those varieties popular only a few years ago, is being challenged.

Palmer turf-type perennial ryegrass has a lot to offer in improved ryegrass performance:

- Improved mowability
- Attractive dark green color
- Excellent heat and drought tolerance
- Good winter hardiness
- Resistance to crown rust and brown patch
- Fine-leafed, dense growth habit

Palmer was developed by Lofts Seed Inc. in cooperation with the New Jersey Agricultural Experiment Station at Rutgers University, under the direction of Dr. C.R. Funk. Another improvement through research. **Palmer,** named for a professional . . . by the professionals.

Lofts Seed Inc.

Bound Brook, NJ 08805
(201) 356-8700 • (800) 526-3890

Great Western Seed Co., Inc.
Albany, OR 97321
(503) 926-5892

Lofts/New England
Arlington, MA 02174
(617) 648-7550

Sunbelt Seeds, Inc.
Tucker, GA 30084
(404) 491-1311

Lofts/Maryland
Beltsville, MD 20705
(301) 937-9292

Lofts/New York
Cambridge, NY 12816
(518) 677-8808

Palmer turf-type perennial ryegrass is a product of Lofts Seed Inc. and Great Western Seed Co., Inc.

Available Fall 1982 Circle No. 116 on Reader Inquiry Card

(Fuerst) and a large verticutter (modified Grounds Groomer). For both latter implements seed was broadcast before flex-harrowing or verticutting. 'Ky 31' tall fescue was used at a 7 lbs/1000 sq. ft. rate.

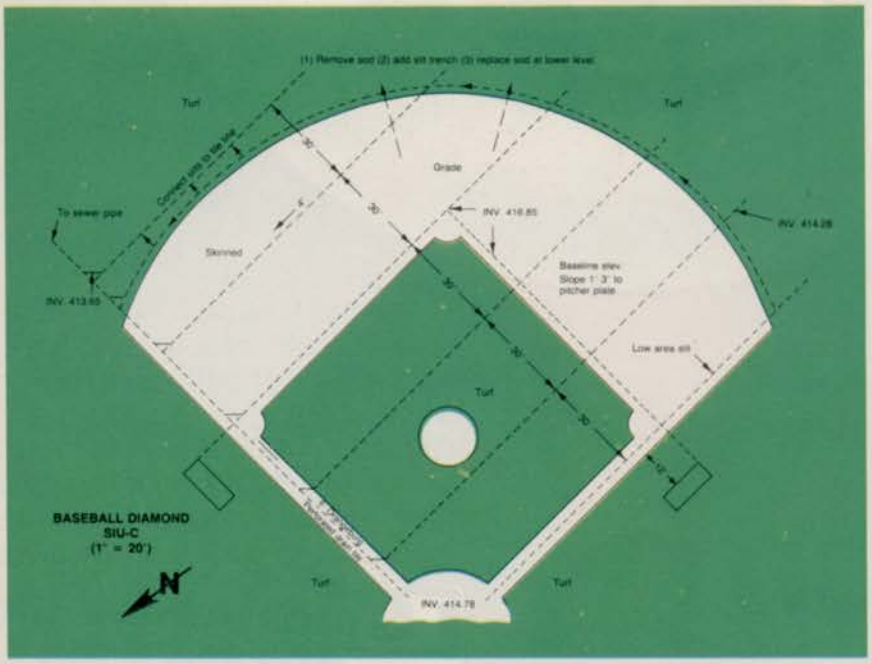
3. The entire area (except infield and base paths) was then seeded with a ½ lb/1000 sq. ft. blend of Kentucky bluegrass ('Baron' and 'Parade') and rolled with a Brillion seeder/roller.

Results were excellent with two passes of the Grounds Groomer giving the best results.

A third baseball field at an outlying city park and recreation area was renovated in 1976. The major problems were a very uneven outfield and almost no grass except a few spots of common bermudagrass. A large roadgrader with front spikes was used to work and level the field, plus additional soil was added to a low corner. The field was limed and fertilized according to soil tests. 'Ky 31' tall fescue at 7 lbs/1000 sq. ft. was cyclone seeded and raked in. One-third lb/1000 sq. ft. of Kentucky bluegrass was Brillion-seeded. Results were most acceptable except that the areas of bermudagrass have increased. However, since play on this field is primarily in the summer, the bermudagrass is green and very wear-tolerant so it is not objectionable. Since the infield is not sodded in either the woman's softball or the park's field, good surface drainage is sufficient.

Reseeding or resodding of worn areas is an almost continual renovation practice. If species or cultivar changes are wanted, one can completely kill with glyphosate, aerify, seed, and verticut or just seed and verticut several times. This same procedure, but without killing existing turfgrass, and generally using the same species or cultivar is best for small worn areas. Or, as noted earlier, resodding is often practiced with quicker establishment and almost immediate play.

Only soil surface modification will be discussed here since full soil modification entails complete reestablishment rather than just renovation. The use of calcined clay has already been noted for the skinned areas. Other commercial products are also available for water absorption and conditioning of skinned areas. Pulverized brick is another good surfacing material. Sand is not as desirable because if it is fairly fine, it tends to blow when dry and if coarser-textured it is often too sharp or loose for players and the ball. Sand also has no water-absorbing capacity.



Slit trenches *spaced 30 ft. apart move water to the perforated drain tile along the third base line.*

One increasing practice is the installation of an irrigation system. Most often it only occupies the infield and perhaps one line of sprinkler heads is located around the short outfield, although some total irrigation systems are used. This provides better quality turfgrass, especially in the summer but is a fairly costly renovation and does increase the maintenance. Two precautions with an irrigation system: 1) there should be adequate surface drainage and tiling and, 2) one or two lines of heads should be installed to syringe only the skinned area. This area needs much less water than the grassed infield or outfield. Alternatively, variable-speed heads can be used with setting of fast for skinned area and slow for infield/outfield.

Maintenance

Maintenance of baseball fields usually includes fertilization, mowing, cultivation, pest control, almost daily leveling of skinned areas, dust control, and traffic/usage control. Maintenance practices may vary considerably according to turfgrass species and season of peak use. For example, the most usage for educational institutions is spring and sometimes fall, whereas recreational usage is greatest in the summer. The problem is to be able to "get in" the cultivation, reseeding, or other maintenance or renovation operation while practice and games are "in season." Also, species selection in the transition zone varies depending on the heavy use period; universities and high schools with early to late spring play should use cool season grasses such as tall fescue (outfield) Kentucky bluegrass (infield) and occasionally perennial ryegrass as a temporary filler in the Midwest and sometimes as a major component in the mixture in the East. For recreational ball fields, Bermudagrass or zoysiagrass will stand the summer use best. I will briefly refer to recommendations for the transition zone

continued on page 54A

OUR NEW 62. WE PICKED ITS ENGINE APART.

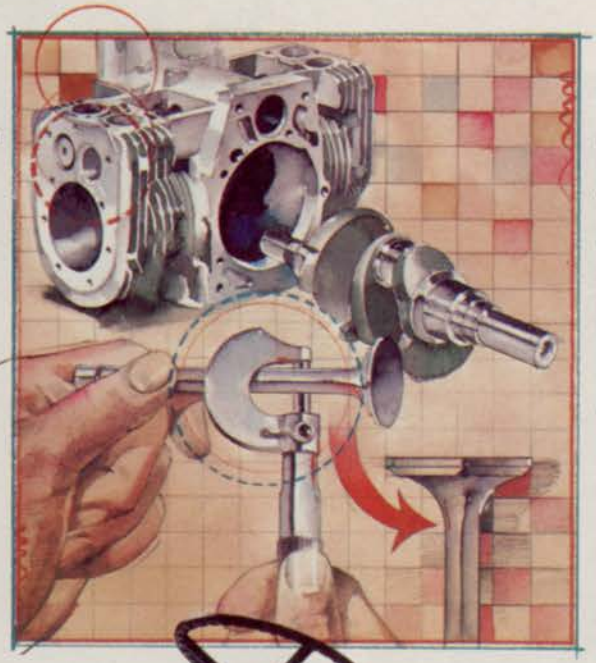
BECAUSE WE'RE PICKY ABOUT POWER.

When Toro introduces a new riding rotary mower, you can be sure it's engineered to keep you cutting.

Because, for one thing, we never forget that engineering begins with *engine*. Picking exactly the right power to match width of cut and kinds of attachments.

Too much power wastes fuel and is inefficient. Too little power stunts productivity and works the engine to death.

So we've powered our new Toro Groundsmaster® 62 with an Onan 20 hp, twin cylinder engine. But only after considering 10 excellent candidates, narrowing them down to 3 for testing, then literally picking apart our final choice.



We tested it on a dynamometer to verify its power rating. We tore it down and inspected it part by part for durability. We tested it for noise. We tested it for vibration. We tested it for fuel economy. Then, we ran it hard for 1,000 hours to make sure it was up to going to work for our new 62. And you.

And, to keep you cutting, we evaluated its serviceability, too. Made sure its routine maintenance points and replaceable oil filter are easy to get to.

Call your Toro distributor. He'll tell you more about our new Groundsmaster 62. The high capacity 62" professional now teamed with our Groundsmaster 52 and gas and diesel Groundsmaster 72s to offer you a complete line of riding rotaries.

TORO®

THE PROFESSIONALS THAT KEEP YOU CUTTING.

"Toro" is a registered trademark of The Toro Company, 8111 Lyndale Ave. So., Minneapolis, Minnesota 55420.

Circle No. 130 on Reader Inquiry Card

This slope was cleared with Roundup–then planted with a ground cover.

ALWAYS READ AND FOLLOW LABEL DIRECTIONS FOR ROUNDUP.
Roundup® is a registered trademark of Monsanto Company. © Monsanto Company 1983. RUP-SP3-103

"ROUNDUP® SAVED ME ABOUT 6 DAYS ON THIS RENOVATION."

"WITH ROUNDUP, I NOT ONLY SAVE TIME, I CAN ALSO DO A BETTER JOB. BIG JOBS OR SMALL ONES. EXTENSIVE RENOVATIONS—OR JUST AN AREA UPGRADE. THE FACT OF THE MATTER IS, I COULDN'T BE AS COMPETITIVE WITHOUT ROUNDUP."

CARL SCHIEFER
OF CARL'S LANDSCAPING, INC., LAGUNA HILLS, CALIFORNIA.

Carl Schiefer runs an award-winning landscaping business in Orange county, California. In that part of the country bermudagrass is an extremely tough perennial weed problem in lawn and shrub areas. Carl solves that problem with Roundup® herbicide.

"We spray Roundup, and 7 days later we can plant. That's because Roundup has no residual soil activity. With conventional methods, we'd have to spend days digging up the rhizomes. In some areas, that means going down at least 12 inches if you're going to do an honest job. With Roundup, we can destroy the weeds, roots and all. On this particular site, I figure I saved about 6 days with Roundup."

When you renovate a lawn or slope with Roundup you won't have to dig, disc or use a sod cutter. Just apply Roundup when the old lawn is actively growing and at the proper stage of growth. Then come back 7 or more days later to power rake, till or slice—then plant. Your customers will like Roundup too, because the work site can hold up to light foot traffic during renovation.

Roundup can help make your workforce more efficient and your bidding more competitive. When you add it all up, that's the kind of edge you need to be successful today. Just ask Carl.

FOR MORE INFORMATION ABOUT MAKING LAWN RENOVATION MORE PROFITABLE WITH ROUNDUP, CALL 1-800-621-5800 TOLL FREE. IN ILLINOIS, CALL 1-800-972-5858.

Monsanto

Round up was also used for trimming and edging around new plantings, as well as follow-up maintenance.

Circle No. 121 on Reader Inquiry Card

LANDSCAPE MANAGEMENT

PARKS S-T-R-E-T-C-H TO MEET FIELD DEMAND

Park superintendents add fields while budgets and staff stay the same. Utility turf programs and old equipment may not be enough to keep fields in play.

By Bruce F. Shank, Executive Editor

Park superintendents are stretching resources to keep up with demand for playing fields according to the latest *Weeds Trees & Turf* Landscape Management survey. Meanwhile, budgets remain the same and equipment is doctored to keep it in use.

More than two-thirds of the respondents in the survey indicated their equipment budgets were not enough to buy the equipment needed to keep up with increased field use. Seventy percent said they had increased the number of fields to meet the demand for fields by sports leagues and taxpayers. Despite this, only 18 percent have had a budget increase and 27 percent have had to cut maintenance budgets. Staff size has stayed the same in two-thirds of the cases and decreased in 27 percent.

Stretching resources may be an understatement. The increased use of existing fields is exceding the protection provided by utility turf management programs standard for parks.

The typical annual regimen of park sports field care is spring and fall fertilizer applications of 50-100 lbs. N/acre, aerification twice a year, overseeding worn areas in the fall, and a single application of a postemergence broadleaf herbicide in late spring. Mowing at 2½-inches on an eight-day cycle is common.

Dr. William Daniel of Purdue University terms 2 lbs. N/1,000 sq. ft./year (87 lbs./acre) a minimum diet for turf. Considering the wear sports fields receive, and that overseeding mixtures are often perennial ryegrass and Kentucky bluegrass, a minimum turf diet might be impairing the ability of park turf to recover from injury. Daniel terms 4 lbs. N/1,000 sq. ft./year (174 lbs./acre/year) adequate for cool season lawns.

Tall fescues have a lower nutrient requirement than other turfgrasses and establish slower than ryegrass but faster than Kentucky bluegrass. Fertilization programs should match the turf species. Overseeding may alter the primary turfgrass on northern fields.

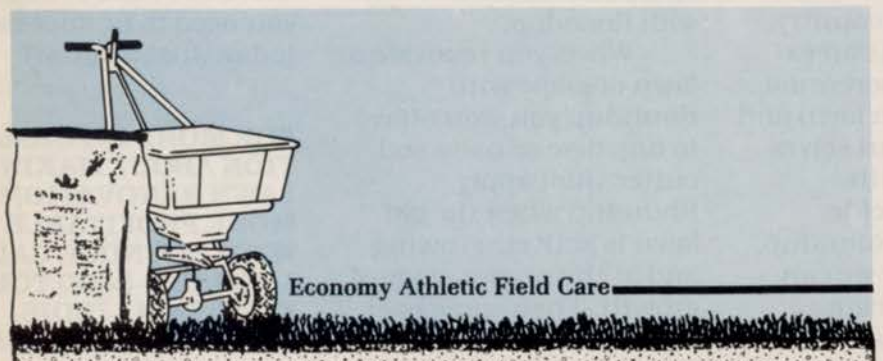
Park superintendents see the pressure from adult sports leagues as the leading factor in increased field use. Soccer and children's sports leagues tied for second. Women's sports was a close third.

League officials do perform some maintenance according to 40 percent of the park superintendents, but league fees do not encourage them to build more fields. Only ten percent said league fees help pay maintenance costs.

Despite the fact that the amount of work has increased and park staffs are staying the same or decreasing, less than ten percent of the park superintendents use outside contractors to perform some maintenance services. Daniel believes, however, that firms specializing in athletic field maintenance will be accepted by public agencies in the future as an alternative with the special knowledge and equipment required to maintain quality athletic fields.

Artificial turf is currently viewed by the park superintendents as a possible option to counteract extensive field use in certain cases. Nearly half thought it may be necessary if field use exceeds the ability of the turfgrass to recover. They

continued on page 66

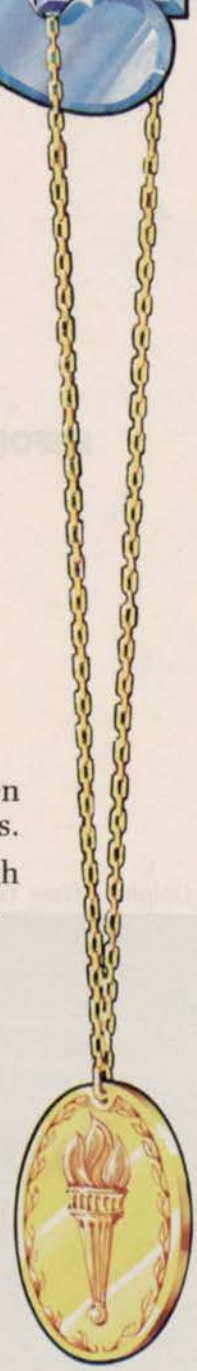


Economy Athletic Field Care

a. Fertilize in early fall with 60 lbs. of nitrogen per field. Slow-release nitrogen formulation of 16-4-8 preferred.
b. Water as needed with traveling irrigation equipment.
c. Mow often at 2 inches.
d. Overseed lightly before games with 5 lbs. seed per field.
e. Mulch thin areas immediately after the last game of the season.
f. Fertilize lightly in late winter or early spring with soluble nitrogen source.
g. Apply preemergence herbicides after first mowing in spring.
h. Apply postemergence herbicide to kill broadleaf weeds before mid-June.
i. Increase cuting height in summer.

MERIT

If they held an Olympics for Bluegrass, Merit would win the Gold



That's because this low maintenance variety so often outperforms the biggest names in Kentucky Bluegrass.

The record shows that Merit is consistently rated high in turf quality and color as well as disease-resistance, including good resistance to leaf and dollar spot.

A variety that is praised for its excellent spring color, Merit also holds its own when subjected to minimum irrigation and fertilization.

Look at the record. In 1972 NE-57 trials, in a five-year New Jersey test, in a New York trial, at an eight-year Purdue study, a three-year Ohio trial and in a four-year Missouri test, Merit often outperformed such bluegrasses as Baron, Nugget, Fylking, Adelphi, Glade and Bonnieblue.

Merit...it's a Kentucky Bluegrass worth looking into

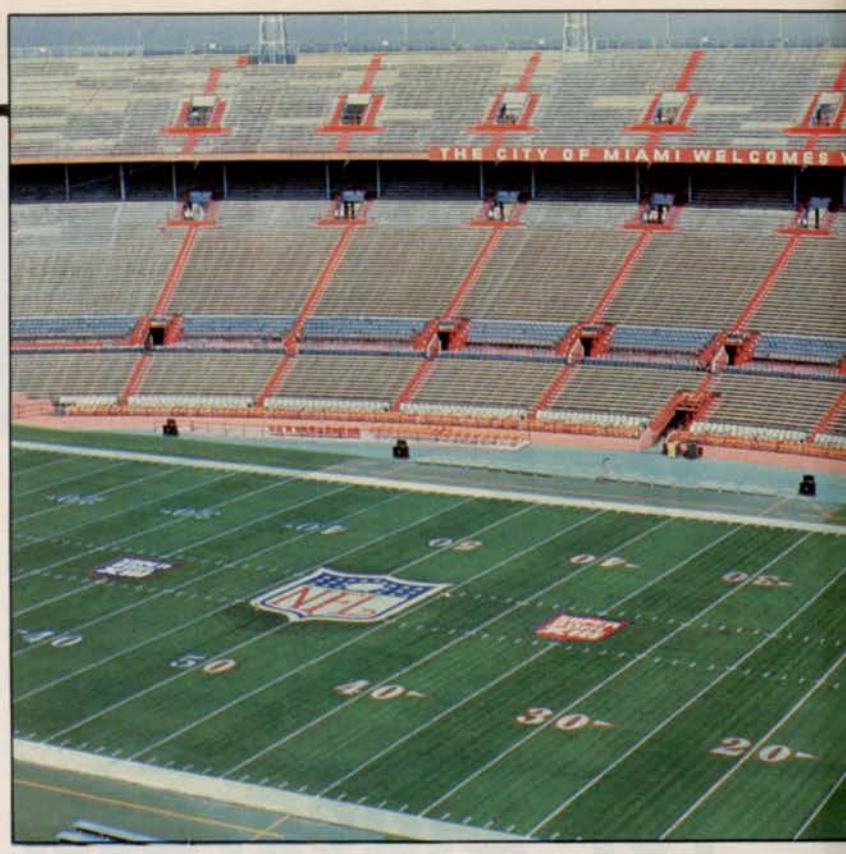
FULL CIRCLE, INC.

P.O. Box 49 Madras, Oregon 97741 (503) 475-3877

CENEX A Subsidiary of Cenex

Circle No. 110 on Reader Inquiry Card

LANDSCAPE MANAGEMENT



BEFORE:

The Orange Bowl

Dale Sandin keeps Miami landmark a step ahead with innovation, determination

By Maureen Hrehocik
Associate Editor

AFTER: *The Miami Dolphins, New York Jets playoff game*

Dale Sandin remembers well the sleepless night of Jan. 22. The grounds and turf manager of the Orange Bowl in Miami listened to the rain pelting down and could only think of his field—the site of the New York Jets-Miami Dolphins playoff game the following day. For three days prior to that, the rain hadn't let up and curtailed the kind of field preparation Sandin usually did before a major game.

"I had scheduled my crew to come in at 5 a.m. the next morning to start getting the field ready as best we could," said Sandin. "When I arrived, water was standing on the entire field at least an inch to an inch-and-a-half deep."

Not even the field's Prescription Athletic Turf pumps, which had been running all night, could keep up with the rain.

At noon the day of the game, the rain stopped and play began at 1 p.m.

"The field was very muddy, but we kept the pumps going and by halftime it had improved considerably," Sandin said. "I went out to inspect the damage thinking I'd find six to eight inch holes in the playing surface, but surprisingly, it was only chewed about an inch to and inch and a half. We still had firm footing underneath. I credit most of it to our PAT system."

While the weather is probably the most unpredictable element Sandin works with on his field, it is certainly not the only concern on a field that is used for 35 events during the football season, 10 events during the off season, pro, college and high school football games, rock concerts, religious functions and special attractions. The Orange Bowl turf every year hosts the Orange Bowl Classic and Orange Blossom Classic and some years the Super Bowl. It was turned into a boxing arena for the Alexis Arguello prize fight, hosted the likes of Jimmy Buffet and endured the pounding hooves of the University of Colorado's mascot—a buffalo.

With all of these varied uses, Sandin takes pride in his stadium as not only offering excellent playability, but also as a public relations tool for the city of Miami.

"When people see this stadium on national TV, they see a good side of Miami, one that works, and I'm proud of that," Sandin said.

The Orange Bowl is only one of three pro stadiums to have installed a PAT system, developed by Dr. W.H. "Bill" Daniel, professor of Agronomy at Purdue University. Only Kennedy Stadium, home to the Washington Redskins and the Denver Bronco's Mile High Stadium, sport the system that provides for removal, conservation and addition of water to the field through pumps attached to drain lines which draw the excess water away from the playing surface. Sandin describes it as a "bathtub effect"—the plastic liner underneath the field holding the sand, drainage pipes, soil and turf. The Orange Bowl's system was installed in 1976 after Astro Turf that was laid in 1970 was removed.

"When people see this stadium on national TV, they see a good side of Miami, one that works and I'm proud of that."
—Sandin

Sandin said he uses his Rainbird overhead sprinkling system the majority of the time, but sometimes needs to irrigate near a playing date.

"Then we use the PAT system," he says. "I've found it helps control disease because the soil drains well."

Another reason Sandin sings the praises of the PAT system is because of the Miami-area weather.

"Last year we had a drought," he explained. "We couldn't irrigate the field. With the PAT system, we held a reserve of water under the field at a level we predetermined. It can be a lifesaver."

The sideline and goal post areas are not in the PAT system.

The 2½-acre Orange Bowl is sodded with a 419 Tifway bermudagrass grown in sandy-type soil, similar to the soil mixture on the field.

"The ideal way if you have the time is to vegetatively plant the field using sprigs," Sandin said. "that way you're not contaminating the soil with a nursery soil. I've found Tifway to be aggressive and hardy in this climate. It's also very available."

Sandin's irrigation schedule depends on the weather. In the summer he irrigates more. Around April he is trying to discourage his overseeded ryegrass and lets the field dry out more. Sandin uses Derby ryegrass as his overseed from November on. He says the Ph.D blend of Derby, Regal and Elka gives him good results.

His main reason for overseeding is cosmetic.

"With national television here quite often, I have to keep the field looking good. When the bermuda wears down the roots are left, but the top blade is destroyed. We need to beautify it a little bit. It also protects the root system of the bermuda. Ideally, I would like to overseed and then keep traffic off. But, on a field like this, of course that's impossible. I can't put up a temporary playing field in the parking lot."

To give him more turnaround time, for the past two years Sandin has been pregerminating his seed and finds by doing that it gives him as much as four days lead time on the grass.

"If you seed on a Sunday or Monday, the grass usually pops through the next Saturday or Sunday and that's usually right around game time. The grass gets ripped out immediately. When I pregerminate, the shoots are coming up in about three days.

To pregerminate, Sandin soaks his seed in water for about 36 hours changing the water every eight to 12 hours. The seed is then spread on the concrete concourse and approximately 500 to 1200 pounds of calcined clay in the form of Terra-

continued on next page

green or Turface are added. Sandin says this absorbs water quickly and acts as a carrier.

"We can spread the seed on the field within two hours."

A little crowsfeet which is discouraged with MSMA is about the only weed problem Sandin has to contend with. Disease problems are more of a concern.

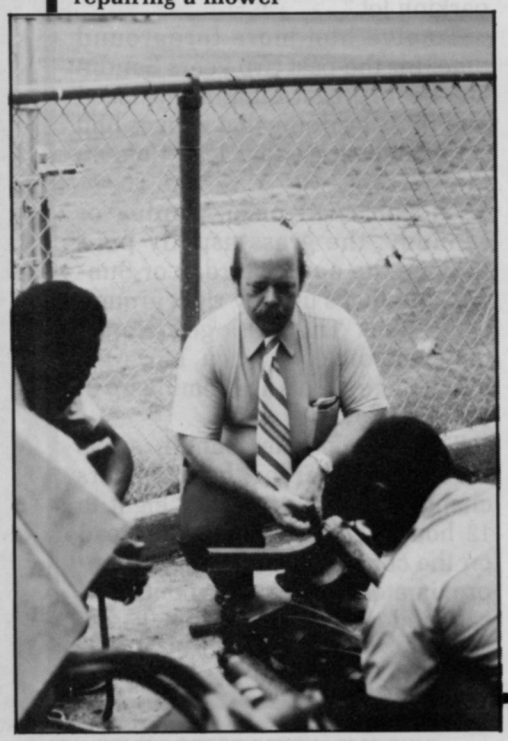
"During the fall, we have a *Pythium* problem. I've been using Koban or Tersan SP. We also use Fore and Daconil as broad spectrum fungicides. We've had some algae problems, but the Fore has nipped that, too. My maintenance program seems to have prevented a lot of disease as well as weed problems."

Nemacur is used once a year to take care of nematodes. Diazinon, Sevin and Baygon are used as needed. Mole crickets are a problem, but Sandin says they are maintained through the regular spraying program.

Chinch bugs and sod webworms are controlled the same way. Sandin says he changes chemicals to eliminate some resistance-type problems.

Sandin uses about 30 pounds of nitrogen a year.

Sandin offers suggestions to workers repairing a mower



"That probably sounds like a lot, but this field tends to require it. It's sandy and drains well. When we use the pump system, it tends to suck out the nitrogen quicker. I've used sulphur coated urea and urea formaldehyde but supplement it with an 18-4-8 complete fertilizer."

The field's fertilizer needs are determined by soil tests two or three times a year. Since Sandin works for the City of Miami, all of his purchasing must be done through the city's purchasing department. Because this can be a slow process, Sandin finds himself having to plan ahead to make sure he has what he needs when he needs it.

"It's not the best, but you learn to work within the system," he says.

Sandin aerifies during the spring and summer and verticuts very frequently (about once a month) to keep the ground loose. During the football season, he can't do it as often. He says he prefers to use the spiking method because it leaves less spots torn up.

Pre-game preparation entails mowing the field three times a week. Sandin starts the season at a ⅝ inch mowing height and graduates up to plus or minus an inch, but never higher than 1 ⅛ inches. Lines are painted. Bench marks are made on each line. A string is stretched to each mark to mark the line. The spray painting is done with a spray gun and templates (a guide for the paint) at exactly a four inch width (an eight inch width is used for the goal line).

"Using templates is a time-consuming task that takes more labor, but what we end up with is sharp, straight lines. We get no complaints from officials, and in pro games, that's very important."

Sandin says the template also helps inexperienced line-painters do a good job.

Next, any decorations are painted on the field such as the Dolphin's helmet or in the case of the Orange Bowl, the King Orange insignia. Goal post adjustments are made depending on whether the game is college or pro.

"We curtail overhead watering 24 to 30 hours prior to any game," Sandin said.

Painting the field takes one to one-and-a-half days and up to two days for decorating, as in the case of the Orange Bowl or Super Bowl. Sandin said NFL consultant George Toma comes in to offer whatever help or advice he can.

"I look at him as a friend," Sandin says. "I can use all the good help I can get."

And after the game? The answer is simple. Prepare for the next game or event.

"We get a lot of debris that blows down from the stands that has to be picked up. We re-sod the dug-up area which is usually not extensive, but it can be. Every game is different as far as field damage depending on the team and weather."

Sandin aerifies during the spring and summer and verticuts about once a month to keep the ground loose.

If it is during an overseeding period, the overseeding continues along with the mowing.

"Sometimes we have back to back games with a college game on Saturday and a pro game on Sunday. In that case, the crew comes in around midnight and works all night retouching lines, repairing sod and cleaning up. Sometimes we use a colorant or dye to get the turf to match and have an even tone, however we don't do this as general practice."

Sometimes the field requires rolling to smooth down the kicked up areas, however, Sandin says the field generally does not tear up because of the PAT system.

Sandin works on a $200,000 budget, including salaries. He has a crew of from eight to 12 including two "lead people," Larry Brod and Bill Campbell. He used to have 35 workers thanks to a Comprehensive Employment and Training Act grant, but since the funds have

Continued on page 44

Using DYRENE for fungus disease control is the smartest thing you've always done.

You know ®DYRENE Turf Fungicide gives you effective control of the various species of Helminthosporium which cause diseases known as melting-out, going-out, and leaf spot.

You know DYRENE also controls dollar spot, copper spot, snow mold (typhula), and rust.

You know DYRENE can be mixed and applied easily with standard equipment, plus it's compatible with other turf fungicides.

You know using DYRENE for fungus disease control is smart. That's why you've always used it. DYRENE Turf Fungicide.

MOBAY

Mobay Chemical Corporation
Agricultural Chemicals Division
Specialty Products Group
Box 4913, Kansas City, MO 64120

DYRENE is a Reg. TM of Mobay Chemical Corporation.

DY83682

Circle No. 118 on Reader Inquiry Card

Workers mark lines on the field using templates.

been curtailed, his staff has greatly diminished. During the season or for special events, he can hire people on an hourly basis.

As grounds and turf manager for the City of Miami, Sandin is also responsible for Miami Stadium which seats 10,000 and is used as the Baltimore Orioles training facility and Marine Stadium, a 6,500 seat water stadium made on an inlet of the Bay of Biscayne. His equipment as well as staff is rotated between the three stadiums. Sandin reports directly to the stadium administrator, Walter Golby.

The equipment inventory includes a Toro Turf-Pro 84 mower, three gang mowers, two Massey-Ferguson tractors, a Lely fertilizer spreader, a Jacobsen verticut and aerifier and Jacobsen tractor-mounted verticut and sweeper, two Kut-Kwicks for the parking lots, two Ford flail mowers, two Cushmans and two Toro Trucksters. Sandin's sprayer is mounted on a Toro Truckster. The stadium uses a Meter-matic topdressing machine, a Lindig soil shredder, two paint spray units (a 35 gallon and a 15 gallon), two Giant Vac vacuums, a few leaf blowers and string weed eaters and edgers.

Sandin, a former golf course superintendent, sees many similarities—and differences—between maintaining a golf course and a sports complex.

"The biggest difference I see is that if the weather is inclement, a golf course superintendent can close his course or at least limit cart traffic in certain areas. Here, the game goes on rain or shine and the field has to be able to withstand it."

Sandin, 39, graduated from the Stockbridge School of Agriculture at the University of Massachusetts with an Associates degree in Turf Management. After graduation, he worked at several country clubs in the northeastern part of the country gaining experience prior to taking a job at Tacoa Country Club in Westfield, MA. He then worked for Zikorus Construction Co. in Connecticut in golf course construction. From there, Sandin went to the Redding Country Club in Redding, CT, where he was superintendent for five years. Prior to coming to the Orange Bowl in 1976, Sandin was the golf course superintendent for two years at Lake Arrowhead Country Club in Canton, GA.

Sandin says he doesn't look at the similarities between the two jobs.

"It's all a matter of maintaining turf," he says. "I have different problems now. My turf is more intensively used than any golf course in the country. The hardest thing for me to accept about this job is the damage the turf must endure."

His varied experience in the field and recognition of a need for more research have been the catalysts for Sandin to get involved in his profession.

A couple of years ago he was having problems in keeping the lines on the field from being depressed due to band traffic.

"Enkamat was just coming out on the market," he says now. "We installed it on the lines and it helped at the time."

Because the percolation area of the PAT system has slowed, Sandin will be putting sand slits in the field by the Cambridge injection system. This, he hopes, will allow the water to percolate better. Sooner or later, he says, the PAT system will need to be redone. By adding the sand, it should last another five to eight years.

Sandin is also working with a Miami designer to come up with a machine that will aerify the entire top soil surface profile no matter what depth.

The Orange Bowl is also bidding to host the World Cup Soccer match in 1986. The field will have to be widened 10 or 15 feet, players' benches will have to be removed along with the area's artificial turf. The PAT system would also have to be enlarged.

"In this business, you sometimes have to put your foot forward and be the first one to try something new or innovative," he says.

And what challenges face the people who maintain sports complexes? In Sandin's opinion, the challenge is simple—to keep your turf in as good a shape as possible.

"We'll need to do whatever it takes," he explains. "Turf managers in the future will need to be open to everything. We will need to try worker ideas, be aware of chemicals on the market and the safeguards that protect the applicators as well as the players. We will need to not be afraid of being innovative." **WTT**

STOCKY NEW FORDS. NEW UNDER 30 HP DIESELS!

Tough new 1000 Series Tractors do it all!

Stocky new 1000 Series Ford diesels have the compact size and muscle needed for tough grounds maintenance work.

They offer you a combination of features you can't get anywhere else... including live hydraulics, 540 rpm PTO, diff-lock, and the widest choice of under-30 horsepower models in the industry.

New 3-cylinder diesels power five of the six new models. Your choice of 11.5, 13.5, 16.5, 19.5, 23.5 or 28.5 PTO horsepower.*

Exclusive Synchronized Manual Shuttle transmission lets you shift up, down and forward-to-reverse without stopping. It's optional on larger models only. There's an optional hydrostatic transmission for smaller tractors.

Four-wheel traction. Tight-turning front-wheel drive option can cut wheel slip, and can save time and fuel.

Excellent parts and service backup. Your Ford Tractor dealer has the parts, facilities and know-how to service your tractor quickly and correctly.

These tractors can be fitted with more than 50 implements and attachments to handle a wide range of grounds maintenance jobs. See the stocky new Fords at your Ford Tractor dealer.

*Manufacturer's estimate. Model 1910, 28.5 hp, not available until Fall, 1983.

FORD TRACTORS Ford

Circle No. 140 on Reader Inquiry Card

Growth Regulators

Research is paying off. Growth regulators reduce mowing frequency and suppress seedhead formation on weeds.

By R.P. Freeborg, Ph.D.

Discoloration by growth regulators is the result of slower growing new foliage not covering up naturally dying older foliage.

At Purdue University we began examining growth regulator compounds in the late 1960's to early 70's. At first, the initial objective was to find a growth regulator that would either eliminate or reduce the frequency of the mowing required, thus reducing fuel and labor costs and equipment depreciation. So far, we have not found a compound that can satisfactorily eliminate mowing entirely. Our efforts have more recently been directed at finding a growth regulator that will reduce the mowing frequency requirement to perhaps every third or fourth week within a three month period. The mowing would be in the nature of a trim to improve the appearance of the turf, giving it a better character, color, and uniformity.

The work done with growth regulator compounds has uncovered other important areas outside the turf industry. These formulations can, for example, enhance the sucrose content of sugar cane as well as increase the nutritional value of forage crops. Some growth regulators have also been found to be capable of seedhead suppression which aids in weed control and reduction of weed competition. These discoveries have given rise to added incentive in the development of such compounds.

With some of the growth regulators we have examined we can inhibit a plant to almost any extent without complete kill. All the compounds we have tested will cause inhibition and reduction of growth. Some do so quite severely, but others will actually make a miniature plant that survives through almost any kind of environmental condition.

A compound that will be available in limited quantity this year is presently identified as EL500. It has proved to be a very good growth inhibitor. It enhances the color of the plant and promotes an improved root system. Our test plots have gone ninety days without mowing and without thinning or discoloration of the turf. This product will be marketed under an experimental use permit as "Cutless" from Elanco.

As we examine growth regulators we must also be concerned about what is happening to the plant under the surface of the soil. We need to know what the compound is doing to the tillers, rhizomes, and roots. To accomplish this we have established a greenhouse test wherein sprigs of bluegrass (all taken from one clone to eliminate variability) are planted and then treated with a growth regulator. Thirty days after treatment we harvest them, meas-

continued on page 48

Dr. Freeborg is a member of the agronomy teaching and research staff at Purdue University, West Lafayette, IN. He is one the primary experts on growth regulators in the country.

Wanted:

Disease protection. Flexibility in turf maintenance. Savings in labor and application costs.

The Solution:

Fertilizer Plus Fungicide 7. . . another reason you can always depend on ProTurf for optimum turf performance. Contact your local ProTurf Tech Rep to place your order.

Scotts ProTurf

© 1983, The O.M. Scott & Sons Company, Marysville, Ohio 43041.
All rights reserved.

Circle No. 214 on Reader Inquiry Card

Dwarf grass plants are the result of Ethephon, which keeps all parts of the plant growing equally.

ure top growth, count rhizomes and tillers, and evaluate root development.

EL500 performed very well in this test. The plants treated with this product had dark green color, adequate inhibition, and an exceptionally healthy root system. Failure to inhibit seedhead development seems to be the only major drawback to EL500. The same is true of PP333, another promising compound which is not as yet as fully developed in the turfgrass industry. It is a product of ICI Americas.

A growth regulator that has interested us for some years is Ethephon, sold as Ethrel by Union Carbide. It is used in many agricultural areas to enhance ripening of fruit. One of its unique characteristics is that it tends to dwarf the plant moderately. Compared to other growth regulators it does not have the potential for as prolonged a period of inhibition, but it does keep all parts of the plant growing about equally. A major difficulty is the tendency toward species response, so that if you have a bluegrass, rye, fescue mix, you will find that each is inhibited at a different rate. This results in surface irregularities.

A more recent development in growth regulators has come from Monsanto, and is identified as MON4621 (wettable powder) or MON4623 (granule). It is a good growth inhibitor, it enhances turf color, and provides good seedhead inhibition. This compound will soon be available to the turf industry on a limited basis under an experimental use permit.

A problem that is associated with the use of growth regulators is in fact the result of their success as inhibitors. In a normal healthy turf new leaf growth continually masks or hides the older lower leaves as they senesce, or die. In an inhibited turf, natural senescence continues at a normal rate, and, if the plant is under stress, the rate will accelerate. The inhibited leaf growth cannot hide the dead foliage, and the result is a thin, discolored turf.

The previously mentioned difference in species response, and this appearance of senesced leaf tissue are problems to be overcome before we will have a good growth regulator on the market.

The ability of most growth regulators to suppress seedhead development has aroused interest in these compounds as a means of controlling a plant species and also reducing mowing requirements. The reduced development of the seed stalk eliminates the need for it to be mowed. Over a period of time by reduction of seed development, weeds like *Poa annua* can eventually be reduced until it becomes low enough to control what remains with a preemergent. With proper timing and use one can effect a potential reduction of new plants in the future. Unfortunately, the crucial time element is an obstacle to reliability of performance.

Two products currently available have the potential for seedhead suppression or selective suppression of annual grass growth. One of these is Embark, a compound that provides good prolonged growth inhibition. It also gives excellent seedhead suppression of *Poa annua* without severe inhibition of grass species in a stand of turf.

The other, and more recently available product, is marketed as Rubigan (EL222). It is a fungicide used for control of various turf diseases. In our early work with it we began to see that it inhibited *Poa annua* more than it inhibited the bluegrass. Further testing revealed that it will selectively suppress *Poa annua* and, over a period of time, with frequent use, it will tend to eliminate it in a stand of cool season grass. Rubigan, although it is not a seedhead inhibitor, has this special ability to influence *Poa annua*.

These two products represent to some degree where we stand today. We are not only considering growth regulators as a means of possibly reducing mowing frequency requirements and labor costs, but we are also seeing them as selective herbicides that will reduce the ability of one plant to grow where another remains aggressive, thus effecting a change in turf population. Not every compound fulfills both functions, but there is much promise in the concept of using them in combination with each other.

A problem that is associated with the use of growth regulators is in fact the result of their success as inhibitors. **WTT**

Seedhead suppression by growth regulators has added incentive to develop new compounds.

Circle No. 115 on Reader Inquiry Card

WE REACH THE PEOPLE YOU NEED TO REACH!

Place a classified ad in any of these HARCOURT BRACE JOVANOVICH PUBLICATIONS - and you know your ad dollar is wisely spent.

HBJ PUBLICATIONS does a better job of reaching those who count *(your potential customers)* than any other business publisher.

Magazine	Circulation
American Automatic Merchandiser	11,694
Beverage Industry	22,548
Body Fashions/Intimate Apparel	10,226
Candy Industry	3,800
Candy Marketer Quarterly	10,224
Dairy Field	23,694
Dental Laboratory Review	17,292
Dental Management	102,105
Drug & Cosmetic Industry	10,618
Flooring	22,042
Food & Drug Packaging	66,359
Food Management	51,498
Hearing Instruments	17,708
Home & Auto	22,519

Magazine	Circulation
Hotel & Motel Management	39,793
Housewares	12,765
Lawn Care Industry	12,662
LP/Gas	15,098
Neurology	12,917
Paperboard Packaging	12,594
Paper Sales	12,752
Pest Control	14,722
Professional Remodeling	38,788
Quick Frozen Foods	21,135
Roofing/Siding/Insulation	18,316
Snack Food	9,112
Toys Hobbies & Crafts	13,697
Weeds Trees & Turf	46,082

Don't forget that classified advertising works just as effectively in locating employees as it does if you are looking for a position, have a line, machinery or a business to sell, are seeking representatives or wish to buy a specific item. Let it go to work for you!

HBJ PUBLICATIONS - COUNT ON US TO REACH THOSE WHO COUNT!

HBJ HARCOURT BRACE JOVANOVICH PUBLICATIONS
One East First Street
Duluth, Minnesota 55802

Call Dawn Anderson at 218-727-8511

We promise to tell the truth the whole truth and nothing but the truth. So help us BPA.

As a member of BPA (Business Publications Audit of Circulation, Inc.) this magazine subscribes to the principle that it takes more than good faith to earn the business of advertisers. It takes good figures.

BPA, an independent, not-for-profit organization, audits our circulation data to make sure that advertisers get exactly what they pay for: you.

Once a year, BPA auditors examine our circulation list to make sure it's correct and up to date.

The audit makes sure you are who we say you are. It verifies your name, your company, your industry and your job title. This information enables our advertisers to determine if they're saying the right thing to the right people in the right place.

It also gives us a precise picture of who you are and, therefore, a good idea of what you want as a reader.

BPA. For readers it stands for meaningful information. For advertisers it stands for meaningful readers. Business Publications Audit of Circulation, Inc.
360 Park Ave. So., New York, NY 10010.

BPA

We make sure you get what you pay for.

Double-Edged Sword

Growth regulators can conceivably help Poa annua get through the summer while reducing its spread by seed.

By Jeff Hagman

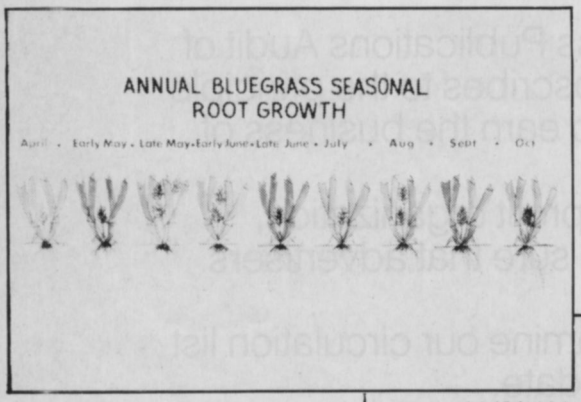
"From the golfer's standpoint, *Poa annua* is like the girl with the curl in her hair," says Dr. Thomas Watschke, professor of turfgrass science at Pennsylvania State University. "When its right, *Poa* is beautiful—it can be mowed close. And because of its density and uniformity, it makes a great fairway surface.

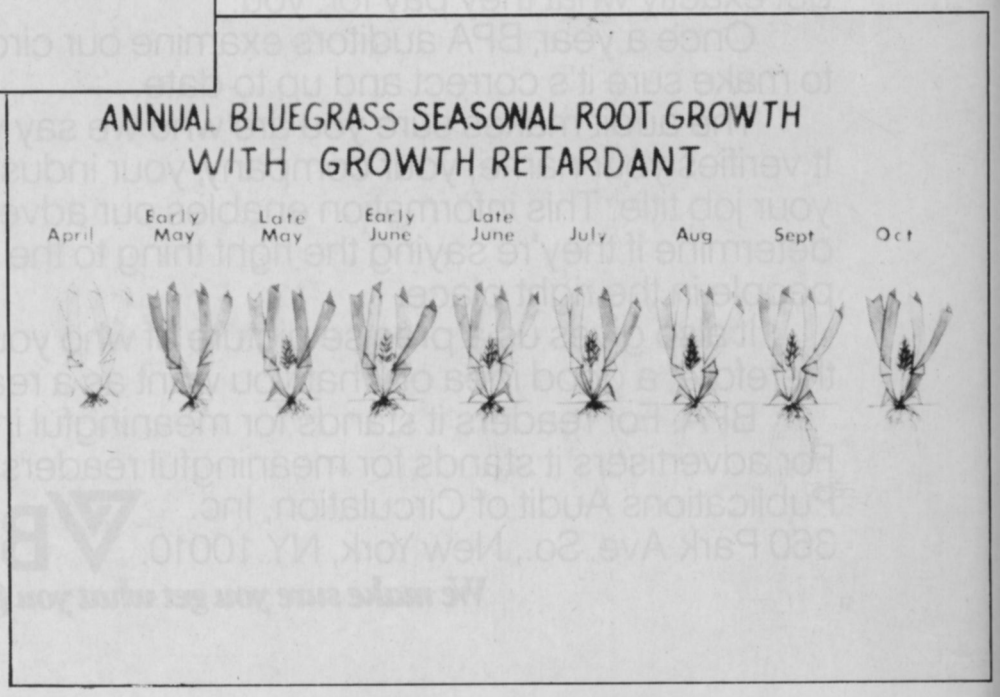
"But when it's wrong, *Poa* can be awful. Golf course superintendents are faced with turf that doesn't mow well, because it produces stiff seedheads which are tracked everywhere to cause sanitation problems, turning fairways a pale oyster-white or yellow rather than green."

Now the development of plant growth regulators (PGRs) by firms like 3M and Eli Lilly Company threatens to end that love-hate relationship between golf course managers and the light green, shallow-rooted *Poa annua* that populates an estimated 90 percent of American golf course fairways.

In the mid-1960's, the increase of automatic irrigation systems and the EPA and OSHA restrictions on lead and calcium arsenates combined to establish *Poa annua* as—in the words of Purdue University agronomist Dr. Ray Freeborg—"a turfgrass by default."

"Before the development of PGRs," explains Watschke, a member of the GCSAA Educational Advisory Committee, "the battle lines were simply drawn. Some golf superintendents said, "I'll accept *Poa annua*, buy an automatic irrigation system, and get more money for my fungicide budget." Or superintend-





Seedhead production *is at the expense of root development in Poa annua. Growth regulators can reduce the bad characteristics of Poa and reduce mowing frequency.*

ents could treat *Poa* as a weed, saying, "Kill it with calcium arsenate and overseed with competitive species."

But PGRs offer what Watschke calls "a double-edged sword," a philosophic and agronomic alternative to pre-emergent root inhibitors like Betasan (Bensulide), DCPA (Dacthal), Benefin, or total soil sterilants like methyl bromide.

"With the new PGRs," says Watschke, "you can improve *Poa annua's* ability to survive. But timed differently, PGRs can be used to help convert a stand of *Poa* to other species." For the last three years, research into the PGR's potential to both promote *Poa annua* root growth and suppress seedhead production has accelerated at universities like Michigan State, Pennsylvania State and Purdue, as well as at golf courses in Ohio, Indiana and New Jersey. If the PGRs succeed in avoiding *Poa annua* brown-out during times of heat or moisture stress, the products could turn what Purdue researchers condemn as "failure grass" into an example of what Dr. Watschke calls "a hot issue—the manipulation of plant growth as a management tool for our advantage."

Most promising for golf course applications is the PGR's ability to shift the utilization of photosynthate stored in *Poa annua* away from seedhead production. Instead, the photosynthate is used or stored in parts of the plant where it could conceivably make it more stress tolerant in the summer. "When golfers end up with their golfballs lying in a bunch of seedheads," says Watschke, "it doesn't offer them a proper shot. In addition, many people have tremendous allergy problems with seedhead-filled *Poa*. I've seen black golf shoes end up yellow. When you're talking 160 seeds produced by one plant, that's a significant pollen load.

"Golf course superintendents can't do much about a plant's metabolic potential. But once it gets its metabolic act together, we can shut it down. And then, with deeper root growth, the *Poa annua* proceeds through the summer stress season morphologically better suited to handle it because of its improved top-to-root ratio."

In late-March, 1983, 3M received EPA approval for use of Embark PGR for *Poa annua* seedhead suppression on fairways using a ½-pint per acre rate. Introduced in 1978 for public works and highway maintenance mowing reduction, Embark (mefluidide) has been tested by Michigan State University turf pathologist Dr. Joe Vargas, Watschke, and Freeborg.

One example of PGRs utility in converting a course from *Poa annua* to a competing species like creeping bentgrass is the work of Frank Dobie, 18-year veteran general manager and superintendent for Sharon Center, Ohio's Sharon Golf Club. Dobie currently uses EMBARK PGR across 22 acres of *Poa annua* on the fairways of his 18-hole course. Over the last 14 years, the Sharon Club's turf has evolved from a predominantly Merion blue-grass stand in 1966 to one with almost 90% *Poa annua* by 1980. Dobie is determined to use the PGR as part of his five-year conversion program to Penneagle creeping bent. But Dobie is realistic. "If we get 50 percent Penneagle here in five years, I'll be thrilled to death."

"If we get 50 percent Penneagle here in five years, I'll be thrilled." Dobie.

Beginning in the Spring of 1981, Dobie sprayed PGR at the recommended rate of a quarter-pound active per acre on all 22-acres of his fairway using a 300-gallon boom sprayer. He followed that with an overseeding of Penneagle creeping bent. Dobie applied the PGR slightly after greenup, keeping the material off the roughs to avoid retardation of the bluegrass there. "The result," claims Dobie, "was very good. The PGR did inhibit *Poa annua* growth on the fairways. By the end of May 1981, the two-weeks of discoloration had ended. The Penneagle was up into the two-leaf stage and by June 1, the fairways looked gorgeous in color and texture. *Poa* still predominates, but we now have more than 5-10 percent bentgrass."

"And the PGR eliminated *Poa annua* seedhead production for us by 90%," concludes Dobie, who predicts that a variety of cultural strategies will contribute to a doubling of his present bentgrass population to 10-20%. Dobie has instituted extensive aerification of his fairways from November to December with a Dedoes aerifier to expose the soil, pick-up the grass clippings to promote the spread of bentgrass, and planting of divots on the fairways with a soil and bentgrass seed mixture on a daily basis.

At Rivervale, New Jersey's 27-hole Edgewood Country Club, golf course superintendent Bill Gaydosh has experimented with PGRs for four years to convert his turf from *Poa annua* to bentgrass. "We've now got 60 percent bent in the fairways," says Gaydosh. "If we can reduce the seedheads from *Poa annua*, it'll be worth it for the aesthetic value alone."

When Gaydosh joined the Edgewood Country Club in 1975, the fairways were populated with almost 100 percent *Poa annua*. Gaydosh initiated an overseeding program with Seaside and Emerald creeping bent. "The *Poa* didn't hold up during the summer unless you used extensive maintenance practices like syringing, aerifying, and disease control."

Gaydosh initiated test plots of PGR in mid-November 1979, using a 16-ounce per acre rate on a single acre of fairway at Edgewood. "The results," Gaydosh remembers ruefully, "were drastic and yellowing, with a reduction of seedheads in the spring and dead *Poa* during the winter." But by 1981, Gaydosh was timing his trial of the eight ounce per acre rate in the spring, "right after green-up." He found the results "very encouraging—with little discoloration and almost no seedheads."

This year, Gaydosh is treating 10 acres of Edgewood fairway with

continued on page 54

Jeff Hagman is a marketing supervisor for 3M, Agricultural and Commercial Products Division, St. Paul, MN.

SWORD *from page 53*

the eight-ounce rate. "If it works as well as we expect," says Gaydosh, a graduate of the Rutgers turf program, "I expect to spray all 50 acres of fairway and 3 acres of tees with the PGR next year. We try to spray in the morning, when the dew is on the turf, using a 100-gallon John Bean sprayer and a Cushman cart. And the timing—just after green-up—is critical."

"Sprayers can be off by 25 to 50 percent. You need accuracy with PGRs." Morris.

"The window which golf course superintendents are dealing with here," agrees Tom Watschke, "is the time between green-up and seed emergence. That can be as little as two to five days. I'd suggest golf course superintendents become hands and knees diagnosticians, peeling back the sheath to witness the seedhead still in the boot. If you apply the PGR, you'll keep that seedhead inside."

With the *Poa* species so sensitive to temperature, the advisability of using a PGR may vary depending on the geographic location of a course. "In New York, Pennsylvania and Northern Ohio," says superintendent John Morris of Highland Golf and Country Club, "you get by fine with *Poa annua*. If I was a superintendent in Minnesota, I'd try to grow *Poa*. But here in Indianapolis, we have such a problem getting through the summer heat stress." As a result, Morris began experimenting with PGRs in the Spring of 1982 on six 1,000-meter plots. The Highland fairways currently support a 50% *Poa* population, and Morris is overseeding with Penncross bent. "That Fall 1982," says Morris, "we sprayed two EMBARK applications mixed with another growth retardant. And it burnt the living tar out of it. But we used a rate much higher than the recommended half-pint per acre rate." This year, Morris is returning with the PGR on a 1000-square-foot plot.

"The first thing a golf course superintendent should do," warns Tom Watschke, "is gain experience with a PGR. Don't use it immediately on all fairways. Use test plots, perhaps a practice fairway, to anticipate the response of your turf. And take areas which will give you the most information. Try a place with lots of developing seedheads in the *Poa* or turf that gives you the most problem in the summer with *Poa* loss due to drought."

Adds Norm Axe, head of the chemicals and fertilizer division of Detroit's Lawn Equipment Company: "We recommend golf course superintendents recalibrate their spray equipment so they know what they're putting down. You've got some latitude in spraying dandelions. But you need *accuracy* with a PGR. Some sprayers can be off by as much as 25 to 50 percent."

"Nothing will tell on you like a PGR," agrees Watschke. "Many golf course superintendents will say its the first time they could get a handle on how precisely their spray operations perform."

"Put your best spray applicators on the job," says Sharon's Frank Dobie. "We use white foam markers to avoid overlapping. Because where ground crews skip or overlap, or where spray nozzles are plugged up, that will be evident."

Prices for commercially-available PGRs vary; 3M's EMBARK averages $140 per gallon. Edgewood's Bill Gaydosh calls that, "a little expensive for me to use, but worth it. My PGR costs per acre is $9.00.

"Research continues on the effects of PGRs on seedhead production and *Poa annua* control.

"There's definitely money to be saved with the use of PGRs," says Watschke. "Properly timed, a golf course manager trying to improve the quality of the *Poa annua* will find the plant has less disease and hence you apply less fungicide. It's also more drought-resistant so you can reduce your irrigation requirements, and causes less wear on mowing equipment due to seedheads. And the PGRs harbor an additional benefit. "Our May mowings dropped form the usual 14 times to five times," says Dobie.

Research continues on the effects of PGRs on seedhead production and *Poa annua* control. The Eli Lilly Company has an experimental permit for Cutless (EL-500) a growth regulator featuring minimal discoloration.

Yet most critical PGR research may still spring from testing by golf course superintendents. Both Meridian Hills in Indianapolis and the Crooked Stick Golf Club in Carmel, Indiana, are experimenting with a variety of PGRs for use in converting fairways from 50% *Poa annua* to bentgrass.

University turf researcher Watschke welcomes that hands-on evaluation. "The more we can encourage golf course superintendents to carefully evaluate new products on their courses, the more widespread will be the acceptance of PGRs. That means improved playing conditions for golfers. "And then, I can retire." **WTT**

Whatever the Reason Whenever the Season

NEW! 3", 6" and 12" Plastic Pop-Ups for Grass, Ground Cover and Shrubs

Use in place of risers in turf areas. Out of sight, out of danger from human and mechanical damage. Install on present line.

Royal Coach/Buckner

4381 N. Brawley, Fresno, CA 93711
(209) 275-0500 TWX 910 362 1167

Circle No. 138 on Reader Inquiry Card

FIELDS *from page 34*

for cool season turfgrasses.

1. Fertilization

In late summer (August, September) apply a complete fertilizer such as 6-24-24 or 12-12-12 (around 2 lbs/1000 sq. ft. of P_2O_5 and K_2)); in late fall (Nov.-after last mowing), apply nitrogen such as NH_4NO_3 at a rate of 1½ lbs N/1000 sq. ft; in spring apply a slow release nitrogen such as IBDU at a rate of 1½ to 2 lbs of N/1000 sq. ft. in early May; smaller amounts of nitrogen and iron to keep color and growth in summer, especially if heavily used and irrigated. Lime is applied according to the soil test, however, if thatch is a problem, 20 - 30 lbs. of lime/1000 sq. ft. should be used annually.

2. Mowing

In spring, mowing should be at least two times a week (remove only ⅓ to ¼ of leaf area) at about one and one-half inches for Kentucky bluegrass and perennial ryegrass and two to two and one-half inches for tall fescue. During summer if not heavily used, mowing heights can be raised one-half inch and mowing can be less frequent.

3. Cultivation

This includes coring (aerifying) to relieve compaction and allow better water infiltration, verticutting, especially if reseeding or removing thatch, and todressing to smooth surface and help in thatch decomposition. Reseeding is a renovation and cultivation operation and coring prior to seeding followed by verticutting or just verticutting helps to move seed into the soil.

4. Pest Control

The major pests are probably weeds. Preemergence herbicides such as DCPA (Dacthal) or bensulide (Betasan) are used for crabgrass and goosegrass control and must be put down in March. A second application is recommended in about five to six weeks. Broadleaf weeds such as dandelion, plantain and even the narrow-leaved wild garlic can be controlled with 2,4-D/dicamba or Trimec in spring or fall. A considerable increase in yellow nutsedge will probably occur with frequent watering of the infield. Although MSMA or DSMA has been used in the past (also for postemergence crabgrass control), the herbicide bentazon (Basagran) is now recommended for nutsedge.

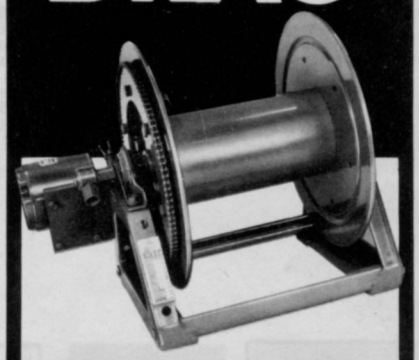
5. Infield Maintenance and Traffic Control.

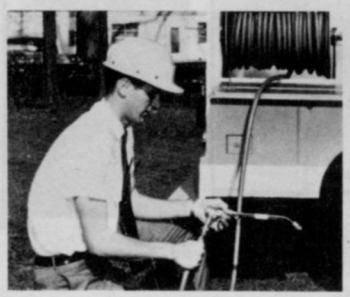
Even if partial or totally automatic irrigation is not available, one must wet down the skinned area shortly before a game. This light watering to keep down dust does not suffice for maintaining a good infield grass. Either a hose-end sprinkler or crawler can be used for infield grass. After play, the skinned area should be dragged and leveled towards the infield to avoid buildup of material along the inner edge of the outfield which prevents water from running off the skinned area and also makes the ball take unexpected bounces.

Controlling traffic or using the field when too wet are difficult to prevent. A second practice field and batting cages are very helpful. Practicing in the outfield helps save the infield. Obviously agreement between coach and maintenance men is most helpful. The other problem is getting in the cultivation, reseeding or renovation when needed since play is from early March to November. Reseeding is best done in late August or September, but players are still practicing. Since sodding can be later in the fall or even in mid-summer, it often wins out over reseeding. Cultivation of cool season turfgrasses should be in April or May—one must get it in between home games, and even then, those players not on the traveling squad stay home and practice. A calendar with home games coordinated with maintenance or renovation practices should be prepared.

This article is obviously written from the perspective of a turfgrass instructor and researcher, but its intention is to provide the players and coaches with the best playing conditions possible. Please check on the many university and trade journal publications available for more information, especially as it relates to your particular climate and playing needs. **WTT**

HOSE WITHOUT A REEL IS A DRAG





Eliminate hose mess with Hannay Reels!

- Store hose neatly, ready to go when you are.
- Pull out smooth & easy. Wind up straight & fast.
- Less wear and tear on you and the hose.
- Fertilizers. Pesticides. Herbicides. Whatever you spray, rely on Hannay!

Request a Free Reel Guide Today!

HANNAY REELS

CLIFFORD B. HANNAY & SON, INC., WESTERLO, NEW YORK 12193

Circle No. 112 on Reader Inquiry Card

BOOKSTORE

335-LANDSCAPE DESIGN THAT SAVES ENERGY by Anne Simon Moffat and Marc Schiler
Practical guide to landscaping a home or office to reduce space heating needs by as much as 30 percent annually. Contains specific planning strategies for the four main climatic zones of the continental United States. **$9.95**

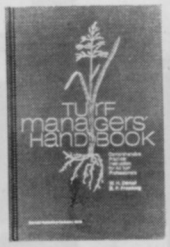
360-RESIDENTIAL LANDSCAPING I by Theodore D. Walker
Provides an in-depth discussion of the planning, design and construction phases of residential landscaping. Illustrated with the work of professional landscape architects. Covers everything from analyzing the site to constructing the landscape. **$22.50**

395-LANDSCAPE ARCHITECTURE by John Ormsbee Simonds
A Manual of Site Planning and Design. This long-awaited second edition outlines and analyzes the complete landscape process from site selection to finished project. In simple and clear terms it describes various planning constraints imposed by the forms, forces and features of the natural and built landscape. **$34.95**

790-RECREATION PLANNING AND DESIGN by Seymour M. Gold
A comprehensive look at recreation needs for parks and how they can design the park facility for the community. Book's content can help justify construction and maintenance needs. **$39.50**

800-THE GOLF COURSE by Geoffrey S. Cornish and Ronald E. Whitten
The first book ever to give the art of golf course design its due, and golf course architects the credit and recognition they deserve. 320 pages and approximately 150 color and black and white photographs. Traces the history and evolution of the golf course, analyzes the great courses, shows how they were designed and constructed. **$35.00**

615-TURF MANAGEMENT FOR GOLF COURSES by James B. Beard
Written by an eminent turfgrass researcher, this USGA sponsored text is an ideal reference and "how to" guide. Details all phases of golf course operations including course design and construction, turf management, course administration, irrigation, equipment and disease and pest control. Fully Illustrated. **$45.00**



010, 015-ADVANCES IN TURFGRASS PATHOLOGY by Dr. B.G. Joyner & Dr. P. Larsen
Leading U.S. turf pathologists report on turfgrass diseases, pythium blight, snow molds, fairy rings, leaf spot of Kentucky Bluegrass in Minnesota, initial and filed fungicide screening, turfgrass disease resistance, etc. Contains new ideas on how to combat turfgrass problems. **$27.95 hardcover, $18.95 paperback**

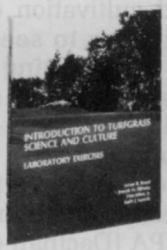
625-ADVANCES IN TURFGRASS ENTOMOLOGY edited by H.D. Niemczyk and B.G. Joyner
A complete account of the facts presented at the 1980 Symposium on Turfgrass Insects. 200 photographs, tables and graphs make this volume an indispensable reference for anyone connected with the turfgrass industry or research. **$24.95**

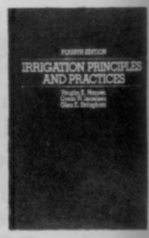
110,120-TURF MANAGERS' HANDBOOK by Drs. William Daniel and Ray Freeborg
This specially designed manual by leading turf specialists is a comprehensive, organized approach to turfgrass science and care. An easy, on-the-job reference for planning, purchasing, hiring, construction and plant selection. **$23.95 hardcover, $18.95 paperback**

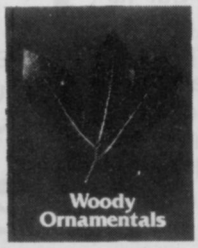
645-MANAGEMENT OF TURFGRASS DISEASES by J.M. Vargas
Identifies turfgrass diseases by description and illustration. Includes a holistic approach to healthy turf and lawns. Presents practical management strategies for golf courses, lawns and athletic fields. 204 pages, Illustrated. **$24.95**

655-TURFGRASS: SCIENCE AND CULTURE LABORATORY MANUAL by Beard, DiPaola, Johns and Karnok
Class tested for over three years, this manual provides fourteen exercises which can be easily adapted to your particular course structure. Exercises involve students in vegetative and seed identification, equipment and irrigation system selection and operation, problem solving of typical math problems involved in turfgrass operations and the diagnosis of problems with emphasis on weeds, diseases and insects. Encompasses both warm and cool season turfgrass. **$10.95**

635-IRRIGATION PRINCIPLES AND PRACTICES by Hansen, Israelsen and Stringham
A new fourth edition of this highly successful textbook presents essential concepts pertaining to water conveyance, application, storage in the soil and use by the plants. Basic underlying principles that govern irrigation practices are stressed. Generalized concepts are discussed and newly formulated practices are examined. **$34.50**





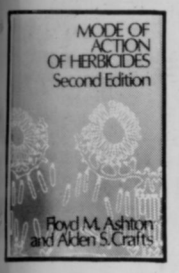


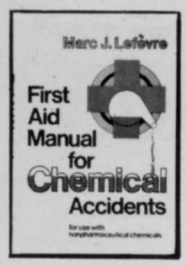
565-WEEDS by Walter C. Muenscher
Second edition. Premier text for identification and basic natural history for weeds found in the continental United States and Canada. Ecological data on weed biology combined with excellent keys and plant descriptions makes this an essential reference book. **$34.50**

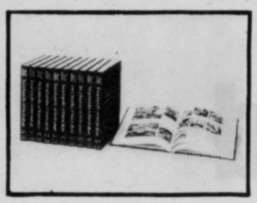
455-THE GRAFTER'S HANDBOOK by R.J. Garner
Revised and updated fourth edition. The encyclopedia of plant propagation by grafting. Contains information on the chemical control of weeds in orchards, on diseases and on the vegetative propagation of woody plants. **$19.95**

405-WOODY ORNAMENTALS by Partyka, Joyner, Rimelspach, Carver
Illustrates plant identification characteristics. Organized in two basic sections: plant identification and plant disorders, this text utilizes 430 color photos, 430 line drawings and 45 black and white photos to simplify identification. Goes into detail on plant identification and description as well as plant problems such as diseases, chemicals, insects, animals and physiological disorders. **$27.00**

BOOKSTORE







575-MODE OF ACTION OF HERBICIDES by Floyd M. Ashton and Alden S. Crafts
Provides worldwide body of information on each class of herbicide. Cross-indexed tables of common and trade names of herbicides are included. New herbicides accepted since 1972 are listed in this revised second edition. Excellent practical reference for specialists in field of weed science. **$47.95**

795-FIRST AID MANUAL FOR CHEMICAL ACCIDENTS by Marc J. LeFevre
This indispensable guide helps you take quick corrective action to minimize the harmful effects of chemical accidents. Written for people (other than doctors) called on to aid fellow workers who are victims of such work-related accidents. A must reference for any work situation involving hazardous chemicals. **$21.50**

555-THE NEW YORK BOTANICAL GARDEN ILLUSTRATED ENCYCLOPEDIA OF HORTICULTURE by Thomas H. Everett
10 volumes compiled in an easy-to-use encyclopedic format with Latin/popular name cross-referencing. 20,000 species, 3600 genera, 2500 cross-references, 10,000 photographs. Slated to be the standard reference source in the field of horticulture. **$550.00**

ADDITIONAL TITLES

340 - CONSTRUCTION DESIGN FOR LANDSCAPE ARCHITECTS $39.50
345 - COST DATA FOR LANDSCAPE CONSTRUCTION 1983 $27.50
410 - DISEASES & PESTS OF ORNAMENTAL PLANTS $29.95
660 - DISEASES OF SHADE TREES $23.50
610 - DISEASES OF TURFGRASSES $30.00
350 - HANDBOOK OF LANDSCAPE ARCHITECTURAL CONSTRUCTION $48.50
510 - HORTUS THIRD $125.00
690 - INSECTS THAT FEED ON TREES & SHRUBS $47.50
370 - LANDSCAPE OPERATIONS: MANAGEMENT, METHODS & MATERIALS $20.95
545 - MODERN WEED CONTROL $21.50
700 - THE PRUNING MANUAL $14.95
720 - SHRUB IDENTIFICATION $8.00
750 - TREE IDENTIFICATION $9.95
760 - TREE MAINTENANCE $35.00
650 - TURFGRASS MANAGEMENT $19.95
630 - TURFGRASS: SCIENCE & CULTURE $27.95
640 - TURF IRRIGATION MANUAL $22.95
620 - TURF MANAGEMENT HANDBOOK $14.65
570 - WESTCOTT'S PLANT DISEASE HANDBOOK $36.50

CLOSEOUTS

ORDER THESE TITLES AT SPECIAL REDUCED PRICES!

450 - GARDENING IN SMALL PLACES $6.75
460 - GREENHOUSE ENVIRONMENT $21.20
480 - GREENHOUSE MANAGEMENT FOR FLOWER & PLANT PRODUCTION $13.00
560 - WEED SCIENCE $21.00

Mail this coupon to: Book Sales
Harcourt Brace Jovanovich Publications
One East First Street, Duluth, MN 55802

Name _____
Street Address _____
P.O. Box Number _____
City/State/Zip _____
Signature _____ Date _____
Phone Number _____

Please send me the following books. I have enclosed payment* for the total amount.
Please charge to my Visa, Master Card or American Express (circle one)
Account Number _____ Expiration Date _____

BOOK NUMBER AND TITLE	QUANTITY	PRICE	TOTAL PRICE

*Please add $3.00 per order plus $1.00 per additional copy for postage and handling.

_____ (postage & handling)

Please allow 6-8 weeks for delivery
Prices subject to change.
Quantity rates available on request

Total Enclosed _____

WTT 63

Worn Out And Overplayed

Sports turf managers are starting to convince others of the needs of natural turf for safe recreation.

By Bruce F. Shank, executive editor

Three or more years of budget cuts have left many park and school fields worn out while new professional sports leagues have placed pressure on stadium managers. Both levels of sports turf need attention to provide safe and wear tolerant fields in the future.

The problem at the park and school level is to convince purchasing directors and councilmen that continued neglect will result in unsafe fields. The problem at the professional level is to develop the technology to enable fields to recover within hours instead of days.

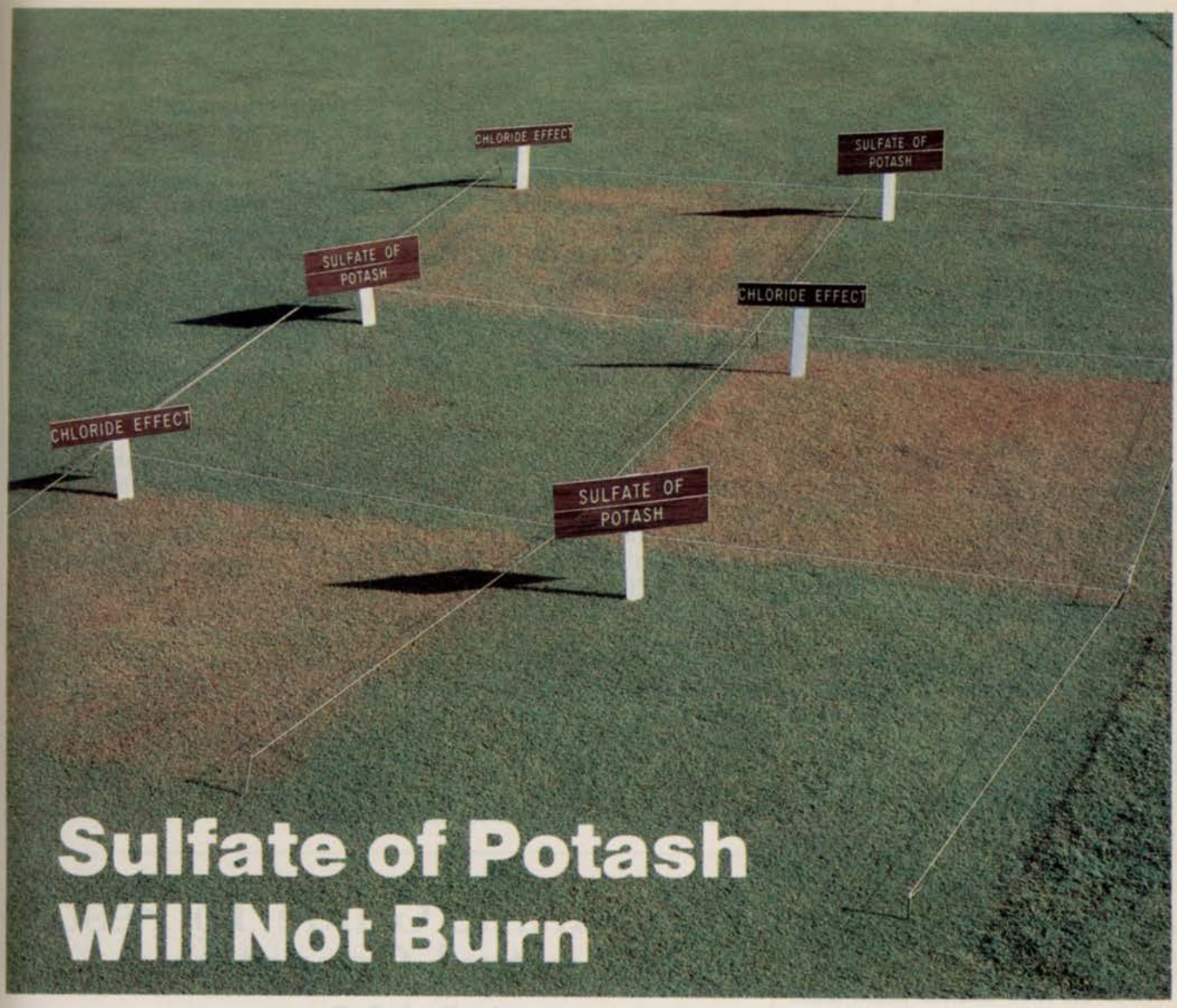
Professional stadia have become multi-function facilities, hosting two or more sports teams in the same season as well as concert events. Stadium operation is often a function of city or county government. However, stadium turf management budgets tend not to be a problem. Artificial surfaces exceed the cost of natural turf. The asphalt base and carpet can cost $1 million or more to install. Top-of-the-line natural turf systems for professional stadia are therefore affordable to stadium management.

While some pay $1 million to construct one athletic field, others feel fortunate to spend $4,000 to renovate a worn out high school football field. "Budget cuts have caused schools and parks to neglect fields the past two or three years," says Roy Zehren, owner of Natural Athletic Turf Inc., Mequon, WI. "Before you can sell construction or renovation of a field you need to explain maintenance. Often the people responsible for the field just don't know how to maintain it. Depending upon their needs and budget, we can renovate a worn out, weed infested field for as little as $4,500. Reconstruction might easily cost $30,000 or more to change grade, rootzone, and sod."

"At the very least, we try to get the field managers on a program of aerification, topdressing with a sand and peat mix, overseeding with perennial ryegrass, and late fall fertilization with a slow-release product," says Zehren. "From there we can suggest a second fertilization in the beginning of August and weed control."

Zehren constructed the last Prescription Athletic Turf (PAT) field in 1979. "Some people are getting confused because of all the variations in field construction," says Zehren. Roughly half of Zehren's business is construction and renovation of golf courses. He has a

continued on page 60



Sulfate of Potash Will Not Burn

The trade has reduced or eliminated potash in summer applications because of the hazard of burn. This is no longer necessary because Sulfate of Potash can be used at the recommended ratio with complete safety. We guarantee it!

Turf burn is a result of high salt index fertilizer, too much chloride and high summer temperatures. **Sulfate of Potash** is nearly chloride free and has a salt index of 0.85 vs 1.94 for muriate of potash. Other sources of sulfur, such as ammonium sulfate, have salt indexes as high as 3.25. There is far less chance of burning turf and gardens if it is mistakenly overapplied, spread unevenly or unexpected weather conditions favor damage.

The safest and most effective potash money can buy!

In addition to 52% K_2O, **Sulfate of Potash** contains 18% Sulfur in the sulfate form, which is the form preferred by lawns and gardens. **Sulfate of Potash** gives better disease resistance to Fusarium Patch, Ophiobolus Patch, Dollar Spot Fungus and Powdery Mildew. It is also effective in suppressing Poa Annua.

Use of **Sulfate of Potash** also results in better rooting, drought resistance, heat and cold tolerance and better wear resistance. And, its excellent potassium/sulfur ratio increases grass response to nitrogen, phosphate and other nutrients.

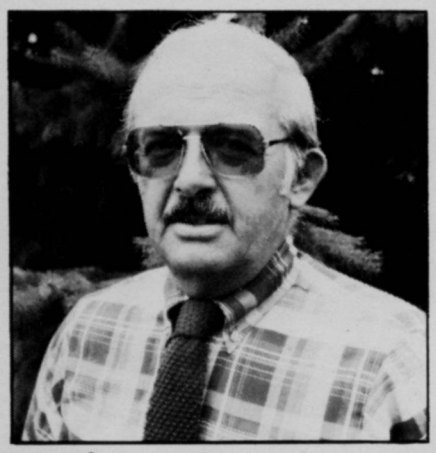
Leading researchers recommend an N-P-K ratio of 3:1:2 for applications on turf. **Sulfate of Potash** can be included in the hottest months to provide vital potassium and sulfur without fear of damage to the turf.

Great Salt Lake Minerals & Chemicals Corp.
P.O. Box 1190 • Ogden, Utah 84402 • (800) 453-4515

Western Office: P.O. Box 14761, Spokane, WA 99214 • (509) 928-2747
Northeast Office: 880 Rosedale Ave., Marion, OH 43302 • (614) 382-5304
Southeast Office: P.O. Box 1102, Smyrna, GA 30081 • (404) 977-2322
Midwest Office: 308 Hemlock, Hutchinson, KA 67501 • (316) 663-6372

A subsidiary of Gulf Resources & Chemical Corporation • Houston

Circle No. 111 on Reader Inquiry Card



Roy Zehren

full-time staff of six.

Steve Wightman is responsible for the modified PAT field at Mile High Stadium in Denver. The field has underground heating, a subirrigation and drainage system, a two-layer rootzone of vermiculite and calcined clay over sand, A-34 Kentucky bluegrass sod grown in sandy loam, and a surface irrigation system. Still, Wightman is concerned about the wear and tear of a minor league baseball team using the field at the same time the Denver Gold football team does. The Orange Bowl in Miami, Jack Murphy Stadium in San Diego, and JFK Stadium in Washington, D.C. all face similar multi-team problems.

Harry Gill at Milwaukee Stadium and David Frey at Cleveland Stadium don't have the advantage of subsurface heating to melt snow and help new sod take root. This year Gill and Frey tried seeding the center field area damaged by football and building plastic greenhouses suspended by blowers. Both the management of the Brewers and the Indians were concerned about players slipping on sod which had not taken root by the season openers. Frey was pleased with the results the week before the Indian's home opener.

"The tarp greenhouse concept has excellent potential," Frey told *Weeds Trees & Turf*. "Footing is much better than sod according to the players. When you consider football season is three months longer and baseball one month sooner than before, you realize the problems facing northern stadia switching over from football to baseball. Grass is still the answer for outdoor stadia and an early seeding with perennial ryegrass and Kentucky bluegrass protected by a tarp is a good solution."

George Toma, field manager at the Kansas City Chiefs/Royals Complex and consultant to the National Football League, is experimenting with pregerminated seed. Toma belives he can gain two weeks by germinating the seed before applying it to the fields.

Meanwhile, park superintendents view the PAT system, tarp greenhouses, and pregerminated seed as practical as a ride in the Space Shuttle.

Wightman used to take care of the sports fields for the Denver Park District. With a staff of six, Wightman had to maintain 270 fields of all types. Mowing alone was a problem, not to mention overseeding, weed control, and aerifying. Maintenance levels had to be specified for fields, most receiving limited care.

Meeting basic turfgrass requirements alone is a problem for many schools and parks. Wear only complicates matters further.

The worn out fields will eventually get attention. "Sometimes things aren't done until a councilman's child gets injured," says Zehren. "If a park or school makes a commitment to renovating one or two fields per year it has made a major step forward. Once renovated, the schools and parks will make an effort to protect their investment with maintenance or face continual renovation. When purchasing directors and board members become aware of the needs of athletic fields, the people doing the work will have the supplies they need to at least cover the basics." **WTT**

While some pay $1 million to construct one field, others hope for $4,000 to renovate a worn-out field.

Scientific Guide To Pest Control Operations

by Dr. L.C. Truman
Dr. G.W. Bennett and
Dr. W.L. Butts

Domestic: $32.50* (hardcover)
Foreign $37.50* (hardcover)

The SCIENTIFIC GUIDE TO PEST CONTROL OPERATIONS is designed to provide a sound basis for studying the scientific aspects of pest control and promote technical competence. It places emphasis on urban and industrial pest problems. This volume also covers the laws and regulations concerning the pest control industry.

The SCIENTIFIC GUIDE TO PEST CONTROL OPERATIONS is written for owners, supervisors, servicemen, salesmen, students, persons preparing for state certification under the EPA/state programs for commercial pesticide applicators, and people interested in structural pest control.

The SCIENTIFIC GUIDE TO PEST CONTROL OPERATIONS - a *must* for anyone involved in the field of pest control!

Return this coupon to: Book Sales
Harcourt Brace Jovanovich Publications
One East First Street, Duluth, MN 55802

Domestic: $32.50* (hardcover)
Foreign $37.50* (hardcover)

YES! Please send me_____copy(ies) of the SCIENTIFIC GUIDE TO PEST CONTROL OPERATIONS.
A check or money order for_____is enclosed.
Please charge to my Visa, Master Card, or American Express (circle one)
Account Number_____Expiration Date_____
*Please add $3.00 per order plus $1.00 per additional copy for postage and handling.
Name_____
Address_____
City_____State_____Zip_____
Signature_____Date_____
Phone_____

WTT 63

Quantity rates available upon request.

Please allow 6-3 weeks for delivery

CREW CUT

Your turf maintenance crew will be pleased with the professional results they get from Ransomes Bob Cat intermediate walk-behind mowers.

Choose a 32", 36" or 48" cutting width to meet your specific needs and enjoy the confidence that comes with good grooming.

Optional riding sulky and grass catchers available for all three units. Mowers are equipped with either 11 HP Briggs & Stratton or 11 HP Honda engine.

See your Ransomes Bob Cat distributor or call Ransomes, Inc., One Bob Cat Lane, Johnson Creek, WI 53038, (414) 699-2000.

RANSOMES

BOB-CAT

Circle No. 127 on Reader Inquiry Card

KC
Royals
THE DESIGNATED HITTER... TRIMEC
GORDON'S
TRIMEC 992
BROADLEAF HERBICIDE
GORDON'S
TRIMEC 352
WEED & BRUSH KILLER
DANGER
NET CONTENTS 5 U.S. GALLONS
TRIMEC
D.M.B. 2
HERBICIDE
3199-1
GORDON'S
TRIMEC
BENTGRASS FORMULA
CAUTION
NET CONTENTS 3.0 U.S. GALLONS
GORDON'S
TRIMEC
GORDON'S
TRIMEC
BROADLEAF HERBICIDE
DANGER
NET CONTENTS ONE U.S. GALLON

YOUR GUARANTEE OF A

TRIMEC®

T.M.

COMPLEX

PROFESSIONAL QUALITY

Groundskeeper George Toma says:

"Look for the Trimec Seal when you select a designated hitter for your turf program."

"The key to efficiency in turf management is to select specific tools for specific jobs, so you can do it right the first time. That's why the Trimec people make a specific complex for use in specific situations. That's why I use Trimec. I call it my designated hitter that bats 1000."

George P. Toma

George Toma is a turf grass consultant. He is groundskeeper for the Kansas City Royals and the Chiefs, and has been in charge of preparing the playing fields for all 17 Super Bowls and Pro Bowls that have been played to date.

As a turf professional you probably agree with your peers that acre for acre and dollar for dollar, Trimec turf herbicide is unsurpassed in effectiveness and efficiency. But perhaps you don't realize that Trimec is being constantly improved through the development of new complexes for use in specialized situations... Designated Hitters to help you increase your efficiency.

Which of these problems are you going to solve with a Trimec designated hitter?

Problem:
The control of weeds like *Spurge* and *Oxalis*, and other tough weeds that have hardened off during hot weather.

Answer:
Trimec Turf Ester. The most recent technological breakthrough in broadleaf weed control. It breaks down the hard waxy cuticle and allows the Trimec to penetrate and do its job.

Problem:
The control of Red Cedar, Brambles, Multiflora Rose, Thistle, Oak, Kudzu, Poison Ivy, Poison Oak and many other hard-to-kill species of brush, without harming desirable grasses.

Answer:
Trimec 352. Years of research have gone into this complex. Thousands of gallons have been used and results are excellent.

Problem:
The control of broadleaf weeds with a herbicide that can be applied with liquid fertilizer.

Answer:
Trimec Lawn Applicator Formula. This Trimec complex is especially designed to be used with large quantities of water.

Problem:
The control of broadleaf weeds with a weed-and-feed granular product.

Answer:
Select a brand that displays the Trimec seal on the bag. Only Trimec makes an herbicide that is specifically designed for granular weed and feed.

Problem:
The control of broadleaf weeds in turf.

Answer:
The one and only Trimec. Select Trimec Broadleaf for cool season grasses, and Trimec Bentgrass Formula for 2,4-D sensitive grasses.

Trimec® is a registered trademark of PBI/GORDON Corporation. U.S. Patent No. 3,284,186.

GORDON'S®

PROFESSIONAL TURF PRODUCTS

pbi/gordon corporation

1217 WEST 12TH STREET
P.O. BOX 4090
KANSAS CITY, MO 64101
816/421-4070

546-183

Circle No. 124 on Reader Inquiry Card

GET TOUGH

on
Dollar Spot
Fusarium Patch
Leaf Spot*
Brown Patch*
Red Thread*

*Approval Pending

alternataive tools to control weed seeds as they germinate. The above materials give better control of annual grasses than broadleaf weeds. Usually herbicides should be applied yearly until the ground cover fills in properly. This will minimize the need for hand weeding.

Keep the area properly watered during establishment and during dry periods.

You could also consider producing ground cover in a sod-like manner. Reports from Ohio State University indicate that plants like euonymus, English ivy and pachysandra can be grown in a sod-like manner and can be rooted into the soil and established 6 months after transplanting into the field. With this method, you should have little need for hand weeding.

Q: *Please give your recommendations for killing tall fescue which is growing up through junipers we have covering a hillside. We have several thousand shrubs, so you can see the magnitude of the problem. The fescue appears to be perennial. What do you recommend that can be applied as a spray directly to the plants without any damage to them? (New York)*

A: Dichlobenil (Casoron) is labelled for the control of fescue in juniper. Casoron granules are easily applied with a hand-held cyclone spreader and penetrate through the foliage dropping to the ground. Casoron, as a wettable powder, may be sprayed over plants, but because of the density of juniper foliage, it is best to direct the spray to the area beneath and around the plants.

A recent report from Ohio State University indicates that dichlobenil, formerly marketed only as Casoron by

PROBLEM SOLVER

By Balakrishna Rao, Ph.D. and Thomas P. Mog, Ph.D.

Q: *Do you have any tips on getting ground covers established under tree canopies without massive hand weeding? (Ohio)*

A: Establishing ground covers under tree canopies is not very difficult; however, to have a weed-free ground cover, beds require a little bit of effort. The following guidelines should help you establish ground cover under trees with a minimum of weed problems and possibility of hand weeding.

Prepare the soil in the planting area by removing the sod and tilling the soil to at least 6 inches deep. If the soil is clay, improve drainage and incorporate organic materials such as leaf mold, compost, rotted manure, peat moss or similar materials to improve the aeration, penetration and infiltration. Based on soil test results, adjust the pH (to 6-7) and fertility levels.

Although plants can be planted at anytime during the growing season, for best results plant them during early spring and early fall. Plants like English ivy, pachysandra or myrtles are usually planted on one-foot centers and cotoneaster, junipers and euonymus three feet apart. For quick fill-up, plant them closer.

Weed problems can be eliminated or minimized by uniformly spreading mulching materials like peat moss, sawdust, wood chips and pine bark. Mulching also can enhance establishment by maintaining uniform temperature and conservation of moisture. Wood chips and sawdust materials can require the addition of nitrogen to speed up the decomposition. Pre-emergent herbicides, such as DCPA (dacthal), diphenamid (Dymid, Enide), norea (Herban), and trifluralin (Treflan) are available as

GET VORLAN™
Fungicide

Cures and prevents
even resistant strains.

At your distributor now!

Tough new ways
to protect your turf

Mallinckrodt

Mallinckrodt, Inc.
St. Louis • Jersey City • Los Angeles
(800) 325-7155
In Missouri: (314) 982-5241

GET TOUGH

on
Cut Worms
Chinch Bugs
Sod Webworms
Billbugs, Grubs and
Many Other Insects

the Thomson Hayward Company, is now available under the following trade names and forms:
Casoron - Uniroyal Agricultural Chemicals (for commercial use);
Dyclomec - Acme Agricultural Products (for home garden use - pbi/Gordon); and
Norosac - Gordon's Professional Products (for commercial use - pbi/Gordon).

Q: *Is there a disease which causes browning and dieback of spreading junipers? It must be a disease because we haven't seen any insects or red spiders. (Pennsylvania)*
A: Dieback is caused by many things and for an accurate diagnosis, the plants or some of the affected branches must be examined.

Cerocospora sequoiae and *Phomopsis juniperovora* are two fungi which cause a blight disease of junipers. Winter injury or drought will also result in symptoms similar to those you described.

Cerocospora starts on the oldest needles of the lower branches spreading upward and outward; whereas, *Phomopsis* infects the youngest needles first.

P. juniperovora is more common than *C. sequoiae* on ornamental junipers. The following information should be helpful in identifying Phomopsis blight. Symptoms start at the tips of branches. The green color of the foliage gets lighter, then red-brown, and eventually turns to an ashen grey. Stems about ⅜-inch in diameter or smaller may have cankers because the fungus grows through the needles and into the stem. These cankers eventually girdle smaller branches. Sometimes small, black fruiting bodies (pycnidia) can be found on dead and dying tissue, usually they appear in the advanced stages of infection.

Phomopsis is somewhat unusual in that it produces two kinds of spores called alpha and beta spores. The beta spores are colorless, one-celled, long and narrow, and curved or hooked on one end. The presence of beta spores makes identification of *P. juniperovora* fairly easy.

Benomyl is federally registered for *Phomopsis* blight and prevents infection of the new foliage.

Poor drainage, shade and overhead sprinkling seems to encourage development of this disease. Situations which discourage infection are well-drained beds, sunlight and watering underneath the branches.

Balakrishna Rao is plant pathologist and Thomas Mog is pest management specialist for Davey Tree Expert Co., Kent OH.
Questions should be mailed to Problem Solver, Weeds Trees & Turf, 7500 Old Oak Boulevard, Cleveland, Ohio 44130. Please allow 2-3 months for an answer to appear in the magazine.

GET DYMET™

Insecticide

Broad-spectrum,
dual formula works
safely and economically.
Labeled for turf and ornamentals.

At your distributor now!

Tough new ways
to protect your turf

Mallinckrodt

Mallinckrodt, Inc.
St. Louis • Jersey City • Los Angeles
(800) 325-7155
In Missouri: (314) 982-5241

Circle No. 117 on Reader Inquiry Card

SURVEY *from page 38*

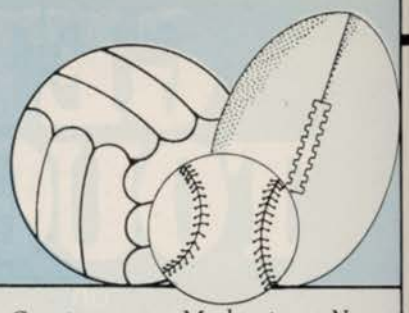
understand players don't like it as well and more than a third feel it should not be used as a substitute for natural turf, but they still see it practical for certain limited cases.

Surprisingly, park superintendents reported they manage more tennis courts than soccer fields. Baseball and softball fields are the most common athletic responsibility of the superintendents with 86 percent managing an average of 14 fields. Nearly 70 percent manage an average of 13 tennis courts. Two-thirds care for an average of 7 soccer fields. Football fields are the responsibility of 57 percent of the park superintendents with an average of 4 fields. Sixty percent are responsible for swimming pools with an average of 2.5 pools. Finally, less than a fifth care for golf courses.

The average acreage managed is 208 acres. The most common title is superintendent of parks and recreation. The closer the individual in charge of fields is to the actual maintenance, the more knowledgeable he is. A set of national standards for park athletic fields could be a major support for park superintendents in combatting intensive wear of athletic fields. We offer Dr. Daniel's standards here as an example.

It seems only sensible to spend a little more for natural field maintenance than a great deal more for an artificial surface. **WTT**

Impact on Athletic Field Use by Percent Responding



	Great	Moderate	None
Women's Sports	48	48	4
Soccer	52	34	9
Children's Sports	55	45	0
Teenage Sports	41	62	0
Adult Sports	69	38	0

4 FOUR BETTER WAYS

TO CONTROL EROSION, DUST . . .
. . . AND GROW VEGETATION TOO!!

✓ 1 **J-tac soil and mulch tackifier**
helps stabilize seed, soil, mulch and dust

✓ 2 **J-tac H.S. hay/straw tackifier**
use instead of asphalt emulsion

✓ 3 **J-tac A.S. aerial seeding tack**
for large area seeding

✓ 4 **MARLOC elastomeric tack**
for delayed seeding critical areas

These four tackifiers have been specially formulated to meet different conditions of erosion, revegetation and dust control.

Some mid-west and eastern dealerships available

RECLAMARE COMPANY
20727 7th Avenue South Seattle, WA 98148
206-824-2385

Circle No. 128 on Reader Inquiry Card

ARM YOURSELF FOR THE BUSY MONTHS AHEAD

. . . . with vital marketing data gathered by our experts in these proven research techniques:

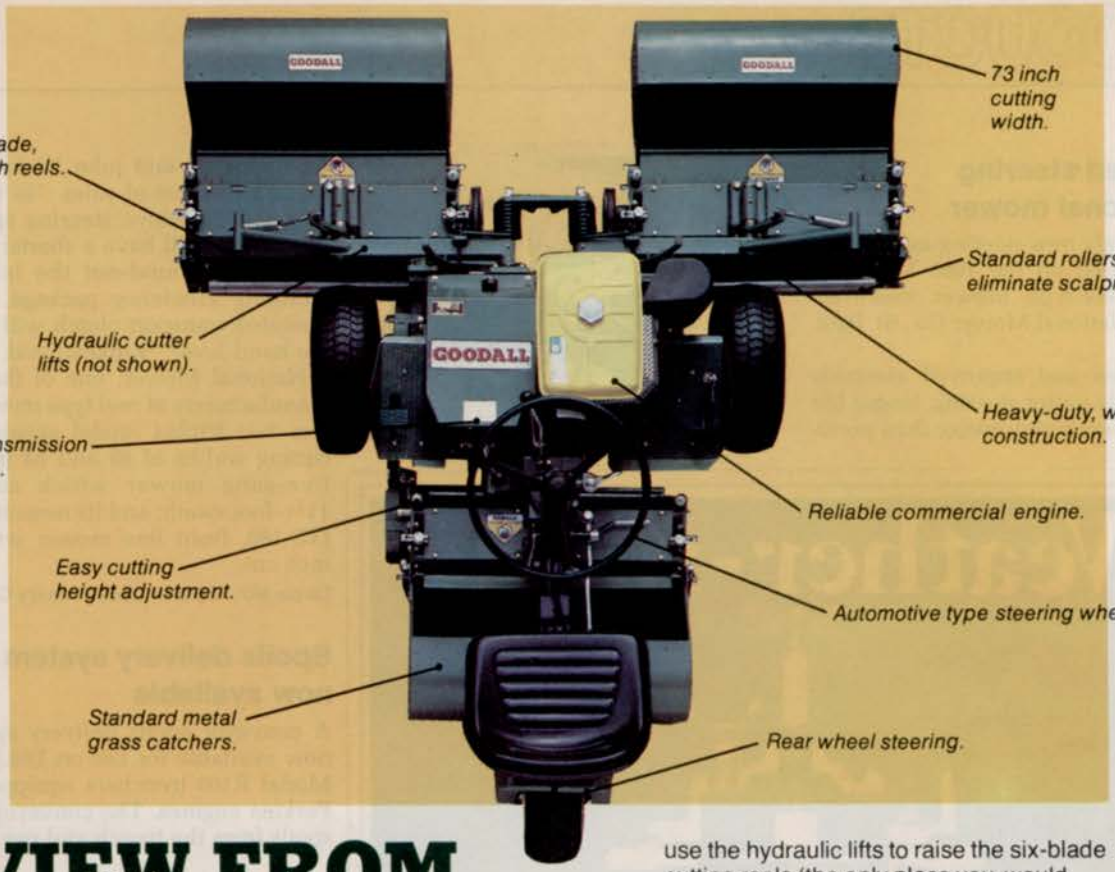
- **WATS Telephone**
- **Focus Groups**
- **Direct Mail**
- **Personal Interviews**

We provide top quality in-house printing, mailing, tabulating, data processing, and analytical systems.

Count on us for your special research needs.

Free Cost estimates.

Infometrics
National Research Center
A SERVICE OF HARCOURT BRACE JOVANOVICH PUBLICATIONS
131 West First Street, Duluth, Minnesota 55802 Ph: (218) 727-8511



A VIEW FROM ABOVE SHOWS WHY THE GOODALL TRIPLEX DELIVERS A QUALITY CUT BELOW.

When you climb into the driver's seat of a Goodall triplex mower you will immediately appreciate its engineering and construction. Once you see the quality cut it delivers on your tees, collars and approaches, you'll know it's no ordinary mower.

First, notice its basic design. No jungle of hydraulic motors and hoses. No sheet metal boxes hiding this and that. Just good clean design. Followed up with good solid construction.

Can something so simple perform such a complex job? Drive on!

You'll be impressed by the excellent maneuverability and stability achieved by the three wheel design, low center of gravity and wide wheel base, as you run it around your hard to cut traps at $^{7}/_{16}$ of an inch and 3 mph.

And, the versatility is unmatched as you can quickly adjust the cutting height up to 2¾ inches and mow your roughs at up to 6 mph.

When you're ready to transport it, use the hydraulic lifts to raise the six-blade cutting reels (the only place you would really want hydraulics on this baby) and move out at nearly 10 mph.

And that's not all. There's the proven reliability of the 4-cycle Robin engine, the standard front and rear reel rollers, the independent ground and reel speeds and more.

The Goodall triplex is designed and built to produce a quality cut with maximum flexibility and minimum complications.

Now, if all of this sounds too good to be true, give us a call. We'll put you in the driver's seat so you can look down and see for yourself.

THE GOODALL TRIPLEX: ENGINEERED AND BUILT FOR THE REEL WORLD.

GOODALL

World's first direct drive rotary.

GOODALL

Division of Bunton Co.
P.O. Box 33247
Louisville, KY 40232 U.S.A.
Phone 502/966-0550 • Telex 204-340

Circle No. 102 on Reader Inquiry Card

Improved steering on National mower

A completely new steering assembly is now featured on the 1983 Model 84 Triplex reel-type mower manufactured by National Mower Co., St. Paul, MN.

"The new and improved assembly will provide easier steering, longer life and even less maintenance than previous models," said John Kinkead, National's director of sales. "In addition to a more positive steering response, the mower will have a shorter turning radius. To round-out the increased handling efficiency package, a foot-operated transport clutch will replace the hand lever," Kinkead said.

National Mower, one of the oldest manufacturers of reel type mowers, offers two triplex model mowers with cutting widths of 68 and 84 inches; a five-gang mower which cuts and 11½-foot swath; and its newest model, JTS-180, front line mower with a 71 inch cut.

Circle No. 150 on Reader Inquiry Card

Weather-matic

This is the famous Weather-matic valve for automatic lawn and turf irrigation systems. Our brass and glass-filled nylon models are engineered and crafted to be the standard by which other valves are judged. It's the standard of comparison because it *works*, long and hard. We know it will before it leaves our factory, for *each* one (not a "representative sample") is pressure tested to be sure.

It teams up perfectly with Weather-matic sprinkler heads, controllers and the Rain-Stat® to make the system that can't be beat.

The integrated Weather-matic system is your trustworthy investment in landscape maintenance. Write for the name of the Weather-matic distributer in your area.

You can't beat the Weather-matic system, because it *works*.

Weather matic. LAWN AND TURF IRRIGATION

Weather-matic • Box 18205 • Dallas, Texas 75218

Circle No. 135 on Reader Inquiry Card

Spoils delivery system now available

A conveyor spoils delivery system is now available for use on Ditch Witch Model R100 trenchers equipped with Perkins engines. The conveyor moves spoils from the trench and can deposit

the material to either side of the trench. The conveyor is able to move more spoils than auger spoils delivery systems.

Circle No. 151 on Reader Inquiry Card

Brochure describes Pene-Turf permiability

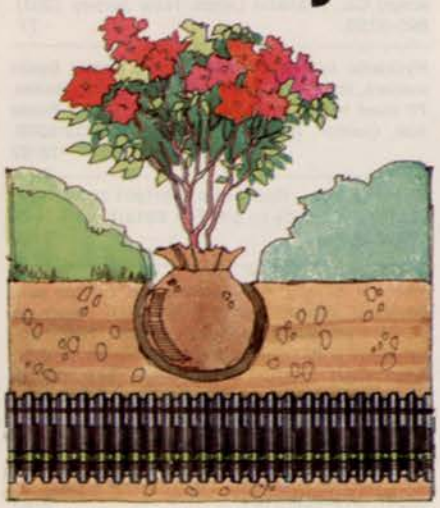
A new full-color brochure published by Four Star Agricultural Services shows how Pene-Turf Soil Treatment can improve permeability and aeration in the soil. An annual application of Pene-Turf can help establish better rooting, eliminate isolated wet and dry spots and reduce soil erosion problems. Independent tests show that Pene-Turf speeds water percolation through any type of soil, thus promoting better drainage. The brochure is available free.

Circle No. 152 on Reader Inquiry Card

ADS Drainage Tubing

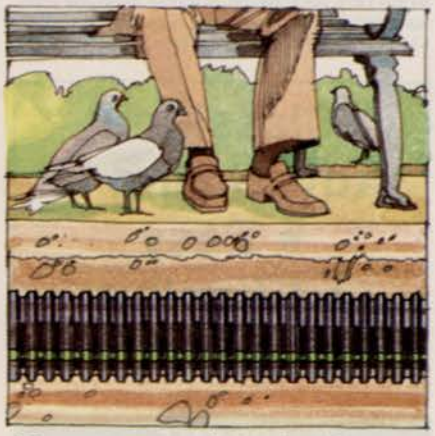
It's dependably tough for your toughest turf jobs.

Flexible ADS drains your greens.



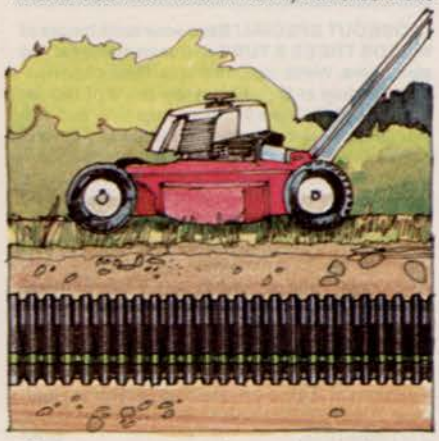
ADS helps maintain beautiful landscapes.

ADS keeps your athletic fields dry.



ADS controls water runoff in heavily trafficked areas.

Sandy soils call for ADS Drain Guard® — the nylon filter that won't block or clog.



ADS tubing — a small part of your turf care budget.

Whether you buy or sell turf care products, you want quality. That's why ADS polyethylene tubing is your best bet. For healthy soil, drainage is important. Strong and durable, ADS tubing provides years of trouble-free drainage, and helps maintain stable soil systems.

ADS is easy to install, requiring less labor and no heavy machinery. A flexible tubing, it follows ground contours and adapts to underground obstacles. And, ADS tubing won't rot, rust or break down during handling or backfilling. A full line of accessory fittings and couplings help simplify even the most challenging installations.

At a cost of just pennies per foot, ADS means quality AND value.

This season rely on ADS drainage tubing. You deserve the best.

SPECIFICATIONS

ASTM F-405, Standard Specification for Corrugated Polyethylene Tubing and Fittings. **SCS,** National Engineering Standard, Code 606. **ASTM F-667,** Standard Specification for 10", 12" and 15" Corrugated Polyethylene Tubing.

Look for the ADS green stripe

It's your sign of quality — #1 in the land.

To serve your drainage needs, ADS operates 21 manufacturing plants nationwide, and the eight regional sales offices listed below:

Madera, CA	209-674-0903
Iowa City, IA	319-338-3689
Bellevue, WA	206-643-2770
Monticello, IL	217-762-9448
Atlanta, GA	404-393-0602
Napoleon, OH	419-599-0585
Livermore, KY	502-733-4324
Palmer, MA	413-283-9797

Circle No. 141 on Reader Inquiry Card

ADS®

ADVANCED DRAINAGE SYSTEMS, INC.

Corporate Office
3300 Riverside Drive
Columbus, Ohio 43221
(614) 457-3051

For additional product and technical information, contact your nearest ADS sales office.

CLASSIFIEDS

RATES: 95 cents per word (minimum charge, $20). Bold face words or words in all capital letters charged at $1.20 per word. Boxed or display ads charged at $75 per column inch (one inch, minimum). Agency commissions will be given only when camera-ready art is provided by agency. For ads using blind box number, add $5 to total cost of ad. Send ad copy with payment to Dawn Anderson, WEEDS TREES & TURF, 1 East First Street, Duluth, MN 55802.

BOX NUMBER REPLIES: Mail Box number replies to: WEEDS TREES & TURF, Classified Ad Department, 120 W. 2nd St., Duluth, MN 55802. Please include box number in address.

BUSINESS OPPORTUNITIES

WANT TO BUY OR SELL a golf course? Exclusively golf course transactions and appraisals. Ask for our catalog. McKay Golf and Country Club Properties, 15553 N. East Street, Lansing, Michigan 48906. Phone (517) 484-7726. TF

PRIME GOLF COURSES FOR SALE: Professional golf course brokers & consultants. **FAIRWAY BROKERS,** 14315 W. 30th Ave., Golden, Colorado 80401. (303) 278-**GOLF**. TF

FOR SALE, TREE SERVICE business in San Francisco, Ca. Excellent cash flow, over $6,500.00 a week. Turn key operation. Over $100,000.00 worth of equipment. Owner will train. Financing available for qualified buyer. Asking $210,000.00. Serious inquiries only to Noel McNabola, CPA, 703 Market St., Suite 400, San Francisco, CA 94103. 6/83

EXCLUSIVE HORTICULTURAL SALES and SERVICE ORGANIZATION in scenic Austin, Texas. Contact Chris Pomeroy, 5500 Balcones, Austin, Texas 78731. (512) 452-7659. 8/83

USED EQUIPMENT

HI-RANGERS AERIAL BASKETS 65', 57', and 53'. Skyworkers aerial baskets 65', 50', 40'. Vermeer stump cutter 1560,6. Vermeer tree spade 66, TS 44. Asplundh bucket and brush chippers, Bean sprayer, 9 ton trailer. Parkway Tree Service, 12026 W. Cherry, Wauwatosa, Wisc. 53226. (414) 257-1555. TF

USED GOLF CARS FOR SALE—All makes and models, 3 & 4 wheel, electric or gas. If we don't have your choice in stock we can get it. Transportation available. Mid-Atlantic Equipment Corp., Collegeville, PA. Call Now! (215) 489-1400. TF

NEW and USED EQUIPMENT Hi Ranger and Asplundh Forestry bucket trucks, Asplundh and Chipmore wood chippers, Stump Grinders, Log Splitters, Crane Trucks. Mirk Inc. (216) 669-3567 (216) 669-3562, 7629 Chippewa Road, Orrville, Ohio 44667. TF

HYDRO-MULCHERS AND STRAW BLOWERS. New and used. Southwest Hydro-Mulchers, 3220 S. Jupiter Rd., Garland, Tx. 75041. (214) 840-2440 (Tx.), (800) 527-2304 (except Tx.) TF

Vermeer TS-44 on 75 IHC 1850 truck. Vermeer TS-30-32 tree spade on M-470 4×4 with loader. Vermeer TS-24 on Case uniloader. Other landscape related equipment. (312) 438-5101. 6/83

TREE SPRAYER for sale. 500 gallon tank, 40 gallon per minute pump, excellent condition. For information call Horizon Estates Landscape Co., Franklin Lakes, New Jersey. (201) 891-9356. TF

Hydraulic cranes, bucket trucks, knucle boom loaders, crew cab tree trucks, dump chip boxes. 75 used trucks in stock. Opdykes Sales, Route 309, Colmar, (Phila) area PA. (215) 822-8300. 12/83

Harley Rake—hydraulic, perfect condition, $2900.00, ready to go. For details call 902-477-4844. 7/83

Vermeer M-470 4×4 articulated tractor with backhoe, dozer, ditcher, $5750.00. Vermeer TS-30 tree spade on diesel crawler, $6500.00, complete with crawler. Vermeer TS-44 on 4×4 articulated tractor with loader, $16,000.00. Howard K-80 tiller, $1500.00. Gill with seeder box, $750.00. Large tree crane on tandem 6×6 for ball sizes up to 9' diam., $10,500.00. Other landscape related items. Adam Fritz Company Inc., 33 Old McHenry Road, Lake Zurich, IL 60047, 312-438-5101. 6/83

SPRAYER, 3000 gallon, 50 GPM, stainless steel agitation with hose, electric reel, on Ford 1000. $14,500. Call (203) 249-1776. 6/83

Classified Advertising is
• Easy
• Effective
• Economical

FOR SALE

CLOSEOUT SPECIAL! Save your back issues of WEEDS TREES & TURF and save money at the same time. We're closing out our line of permanent binders at the special low price of *two for only $7.50!* (This is a $7.00 savings over our regular price plus postage and handling.) Orders will be filled as long as our supply lasts—quantities are limited. Order your binders today from: Book Sales, HBJ PUBLICATIONS, One East First Street, Duluth, MN 55802. TF

Northern grown pure Meyer Zoysia (Z-52) your great water and $ saving turf (Row Planting) "Beauty Lawn Zoysia" (Cincinnati) (513) 424-2052. 8/83

1978 C-60, 1200 Gallon Tuflex Tank, FMC Pump, Mechanical Agitation, Hannay Electric Reel, New Tires, *32,000* miles. Biddle Lawn Care, (217) 359-7012. 6/83

300 acre sod farm, 80 acres of ready-to-sell sod: Hybrid Bermuda, Zoysia, Centapede and common Bermuda. All equipment: tractors, Brouwer sod harvester, fork lift, 2 water machines, pumps, and miscellaneous equipment. Nice climate. Jackson, Mississippi. 150 miles from New Orleans, 200 miles from Memphis. Easy financing. Billy Martinson. (601) 956-5022. 7/83

NEW TREE FERTILIZATION GUN, tested on over a million square feet of trees and shrubs all over the U.S. Good to 500 psi, repairable, non-corrosive. Buy direct from manufacturer, $89.50+ Shipping. Arbor-Nomics, Inc., 5634-A Buford Highway, Atlanta, Georgia 30071. (404) 447-6037. TF

SPRAYERS—FACTORY DIRECT, professional gardeners, turf applicators, proven dependability, unconditionally guaranteed. Black River Sprayers, Dept. 1-A, P.O. Box 11, Long Beach, N.C. 28461. 8/83

COMPLETE TREE SERVICE & SPRAY COMPANY

In western Colorado Town. Established 1956. Owner states over $140,000 annual gross. Includes vehicles & equipment. Present owner has service contracts, will train buyer. $160,000, $35,000 down, long-term owner financing at 10% annual percentage rates.

NEW ... FREE ... SPRING/SUMMER CATALOG!
Top real estate values coast to coast! Please specify type property and location desired.

UNITED FARM AGENCY OF FLORIDA, INC.
Licensed Real Estate Broker
612-IU West 47th St.
Kansas City, Mo. 64112
Ph. Toll-Free: 1-800-821-2599. 6/83

PROFIT is the bottom line using HANSON SPRAYERS and MIST BLOWERS. 1,001 combinations at lowest prices. Send for free catalog. Hanson Equipment Company; South Beloit, Illinois; 61080; (815) 389-2261. 6/83

For sale: 1 each—American Lincoln Model M-2000 Street Sweeper, 53" with high dump. Condition—like new, 114 hours running time. Price Negotiable. Continental 4 cyl water cooled 32HP. All Hydraulic powered. Street worthy. University of Texas at Arlington, Physical Plant (Warehouse), UTA Box 19409, Arlington, TX 76019. 6/83

5 Gang Blitz Jacobsen Mowers—Almost new. Just sharpened. Replacement cost, $7,500.00; asking $3,200.00. Evergreen Sod Farms, 4714 Capitol View Rd., Middleton, WI 53562, (608) 831-1244. 6/83

USED EQUIPMENT SALE—Toro 70" Tee Mower—$950.00. Turf Vac Demo 48" self propelled—$4200.00. Jacobsen 76" Turf King—$1800.00. Jacobsen 76" Turf King (hydrostat)—$2300.00. Toro 80" Front Runner Rotary—$2800.00. Many other models and items available. Central South Turf—Nashville, Tenn., 1/800/251-1404 7/83

TORO PARKMASTER 7—Completely Rebuilt/Repainted with rebuilt reels—$14,500, without reels—$10,000. 1/800/251-1404, Steve. 7/83

Jacobsen F133—5 unit, $4500, Fresh Rebuild, 1/800/251-1404, Steve. 7/83

For Sale/Make Offer: 1978 Toro GM 72", reconditioned 1982; 1977 Howard 60" w/vacuum, reconditioned 1982; 1978 Turf Vac model 80, little hours; 1979 Jacobsen Turf King 84"; 1978 Toro Parkmaster 9 gang; 1980 Bowie Hydromulcher, 1200 gallon, 5th wheel. Maintain, Inc., P.O. Box 1711, Beaverton, OR 97075. (503) 642-2574. 6/83

VERMEER—30 inch tree spade, trailer mounted. $4,500 or best offer. (612) 589-1600. 6/83

CHAMP CB40 TOWABLE FORK LIFT. Good condition ideal for palletized delivery, Garden Centers, sod, etc. $9,500.00. Tuckahoe Turf Farms, NJ, (609) 628-2415. 6/83

SKYWORKER AERIAL BUCKETS—Sales of both new and used. Finest service anywhere in the country. Overhauls and changeovers are our specialty. Best prices on parts. We deal in all types of tree trimming equipment. Ask about fleet discounts. Call or write American Hydraulics, Inc., Route #4, Hartwell, GA 30643; (404) 376-3191.

WANTED

ACCOUNTS WANTED—National chemical lawn care company seeks accounts to acquire. Selling price open for negotiation. If interested, send name, address, phone number and number of accounts available to WTT Box 317. 3/84

POSITION WANTED

GROUNDS MAINTENANCE/LANDSCAPE SUPERVISOR—Seeks challenging position. Schooling, field application in landscaping, design and maintenance. Resume upon request. Jack Pingree, 303 Old Oak Rd., Newark, Delaware, 19711. (302) 731-4082 8/83

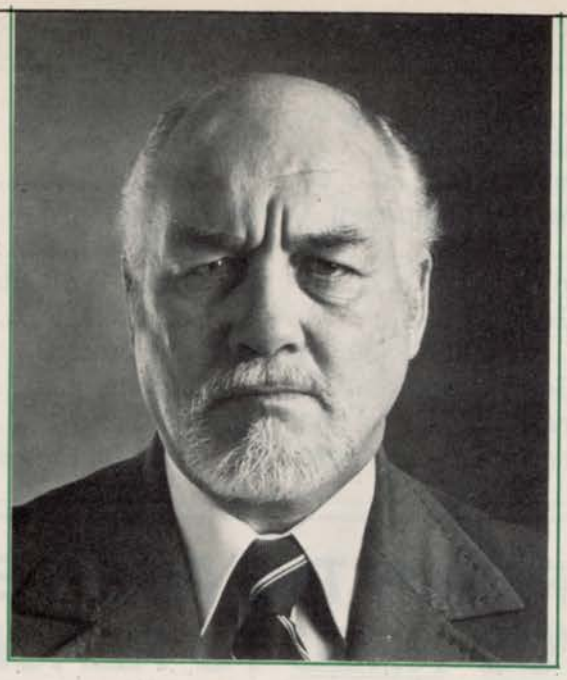
MISCELLANEOUS

DIESEL HI-RANGER TOWERS—48-100 Feet working heights. Daily, weekly, monthly rentals with or without operator. MATLOCK LEASING, Pottstown PA (215) 326-7711 or (800) 345-7711. TF

KELWAY® SOIL ACIDITY TESTER, used by PROFESSIONALS nationwide. Direct reading, portable, serviceable. **Model HB-2 reads** moisture too. Available from distributors. Brochure from **KEL INSTRUMENTS CO., INC.**, P.O. Box 1869, Clifton, N.J. 07015, (201) 471-3954. 10/83

• FOR RENT •
Nationwide
Bucket Trucks 24' to 95'
Digger Derricks
Specialty Equipment
GMI RENTAL & LEASE, INC.
633 Cecelia Drive
Pewaukee, WI 53072
1-800-367-4473
or
414-691-4303

BALL BARRIER NETTING: Made of Olefin fibers. 6½ feet and 25 feet high. Strong and tough. Will not rust. Easy to handle. For Driving Ranges and Golf Courses. Keep golf balls from straying off-course. J.A. Cissel Co., Inc., Dept. JK, P.O. Box 339, Farmingdale, N.J. 07727. (800) 631-2234. 4/83



How to Please the Chairman

And all the rest of the Board at the Country Club. Select Fylking Kentucky bluegrass for fairway seeding, overseeding, sodding. Beautiful, low growing, requires less mowing and nutrients. And—it's an elite bluegrass that costs less.

FYLKING
KENTUCKY BLUEGRASS
U. S. Plant Patent 2887

Another fine, quality-controlled product of Jacklin Seed Company.

Circle No. 114 on Reader Inquiry Card

ADVERTISER INFORMATION

Reader Service Number — Page No.

141 Advanced Drainage Systems 69
101 BrouwerTurf Equipment Ltd. 23
102 Bunton Co. 67
218 Ciba-Geigy Corp. 30, 31
219 Ciba-Geigy Corp. 21
105 Cushman 11
139 Cushman 20A
106 John Deere & Co. ....CV 4
108 Dow Chemical U.S.A. .... CV 2, p. 1
109 Elanco Products Co. 24, 25
140 Ford Tractor Operations 45
110 Full Circle 39
111 Great Salt Lake Minerals & Chemicals Corp. 59
112 Hannay, Clifford B. & Son 54A
114 Jacklin Seed Co. 71
115 Jacklin Seed Co. 49
116 Lofts Seed 33
117 Mallinckrodt 64, 65
118 Mobay Chemical Corp. 43
119 Mobay Chemical Corp. 12, 13
120 Mobay Chemical Corp. (Regional) 50, 51
121 Monsanto Corp. 36, 37
122 Northrup King 7
123 Northrup King (Regional) 19
124 PBI/Gordon Corp. . 62, 63
125 Pennfine Perennial Ryegrass 15
126 Rain Bird Sprinkler Mfg. 9
127 Ransomes 61
128 Reclamare 66
138 Royal Coach/ Buckner 54
214 O.M. Scott & Sons 47
130 The Toro Co. 35
131 Toro Irrigation Div. ....CV 3
132 Toro Irrigation Div. 27
133 Tee-2-Green Corp.... 3-5
134 Trebor Corp. 20B
135 Weather-matic 68
136 Whitmire Research Laboratories (Regional) 72
137 Woods, Div. of Hesston 29

WE REACH THE PEOPLE YOU NEED TO REACH!

Place a classified ad in any of these HARCOURT BRACE JOVANOVICH PUBLICATIONS - and you know your ad dollar is wisely spent.

HBJ PUBLICATIONS does a better job of reaching those who count *(your potential customers)* than any other business publisher.

Magazine	Circulation	Magazine	Circulation
American Automatic Merchandiser	11,694	Hotel & Motel Management	39,793
Beverage Industry	22,548	Housewares	12,765
Body Fashions/Intimate Apparel	10,226	Lawn Care Industry	12,662
Candy Industry	3,800	LP/Gas	15,098
Candy Marketer Quarterly	10,224	Neurology	12,917
Dairy Field	23,694	Paperboard Packaging	12,594
Dental Laboratory Review	17,292	Paper Sales	12,752
Dental Management	102,105	Pest Control	14,722
Drug & Cosmetic Industry	10,618	Professional Remodeling	38,788
Flooring	22,042	Quick Frozen Foods	21,135
Food & Drug Packaging	66,359	Roofing/Siding/Insulation	18,316
Food Management	51,498	Snack Food	9,112
Hearing Instruments	17,708	Toys Hobbies & Crafts	13,697
Home & Auto	22,519	Weeds Trees & Turf	46,082

Don't forget that classified advertising works just as effectively in locating employees as it does if you are looking for a position, have a line, machinery or a business to sell, are seeking representatives or wish to buy a specific item. Let it go to work for you!

HBJ PUBLICATIONS - COUNT ON US TO REACH THOSE WHO COUNT!

HBJ HARCOURT BRACE JOVANOVICH PUBLICATIONS
One East First Street
Duluth, Minnesota 55802

Call Dawn Anderson at 218-727-8511

C

NEW PRODUCTS

Reader Service Number — Page No.

150 National Mower Co. 68
151 Ditch Witch Equip. 68
152 Four Star Agricultural Services 68

This index is furnished for the readers' convenience. However, the publisher can not guarantee its accuracy due to circumstances beyond our control.

New Toro® controllers combine simplicity with total control

Toro's 8+1 and 12+1 electromechanical controllers handle drip irrigation, too!

Here's the latest advance in controllers, solving many of the problems you've reported from the field. For example, we think you'll appreciate that the key to our 8 + 1 and 12 + 1 controllers is *simplicity*, yet with all the control you need. They're simple to install, and that saves you time and money! Simple to *program*, too. And simple to *service*. All the advantages you've been looking for. The "+1" part of our name? That stands for the one extra, *independent* system that controls drip irrigation *simultaneously* with any of the 8 or 12 stations. As far as we know, these new Toro electromechanical controllers are the only ones of their kind available today. As always, a step ahead of the rest . . . TORO!

TORO®

EXCELLENCE IN IRRIGATION

The Toro Company, Irrigation Division
Dept. WT-683, P.O. Box 489, Riverside, CA 92502

Circle No. 131 on Reader Inquiry Card

Choose the utility tractor that'll best measure up to your jobs.

There's hardly any grounds maintenance job too big for the new John Deere 2150 and 2350 Utility Tractors. These 45- and 55-PTO-hp models are totally John Deere designed and built to stand up to jobs many utility tractors back away from.

They're equipped with standard features you'd expect to find only on larger, more expensive tractors. Proven John Deere features that add up to the kind of reliability we've built a tradition on.

Like our smooth-running, fuel-efficient diesel engines. Both the 3- and 4-cylinder in the 2150 and 2350, respectively, are built tough for years of hard work and high productivity.

Shift on-the-go with the synchronized transmission featuring 8 forward and 4 reverse speeds. Double the number of speeds by choosing the Hi-Lo option. An optional shuttle-shift lets you change direction without clutching.

For jobs that require extra traction, choose the optional mechanical front-wheel drive. It engages on-the-go with the push of a button, and works together with the rear differential lock to boost traction.

John Deere closed-center hydraulics respond instantly to tough work demands. The high-pressure system provides hydraulic muscle for steering, braking, 3-point-hitch implements, remote cylinders and hydraulic motors.

The 2150 and 2350 are "human engineered" to enhance operator productivity. Features like a deluxe adjustable seat, color-coded controls, and hand and foot throttles help shorten long days.

Outfit the tractors with capacity-matched John Deere implements to speed up almost any job. And choose optional equipment to exactly suit your needs.

For the name of the nearest dealer, or a free folder on the John Deere diesel utility tractors, call 800-447-9126 toll free (800-322-6796 in Illinois) or write John Deere, Dept. 69, Moline, Illinois 61265.

JOHN DEERE

Nothing Runs Like A Deere®

Circle No. 106 on Reader Inquiry Card